GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2021-2022

Molecular Biology: Advanced Topics in Eukaryotes (0000179)

Due to Covid 19, the education and assessment 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 6.0 **Study time 150 h** **Contact hrs** 60.0h

Course offerings and teaching methods in academic year 2021-2022

A (semester 1)	English	Incheon	lecture	25.0h
			practicum	20.0h
			seminar: practical PC room classes	4.0h
			group work	1.0h

Lecturers in academic year 2021-2022

Chung, Hoo Sun	KR01	lecturer-in-charge

Offered in the following programmes in 2021-2022	**crdts**	**offering**
Bachelor of Science in Molecular Biotechnology	6	A

Teaching languages

English

Keywords

Genome and Gene Structure, Replication, Mutation and Recombination, Transcription and Translation, Gene regulation.

Position of the course

This course aims at confronting the student with the fundamental principles of molecular biology in eukaryotes and zooms in on the structure-function relationship of DNA and chromosomes with regards to replication, transcription, translation and gene regulation. Relevant terminology is introduced and general concepts and principles are presented. An important aim is to bring insight into gene structure, recombination, gene expression and gene regulation, including the differences between pro-and eukaryotes.

Contents

PART I. DNA, CHROMOSOMES AND GENOMES
The structure of eukaryotic genome structure; chromatin and nucleosomes; genome biology, genome sequences and genome evolution.

PART II. DNA REPLICATION, REPAIR AND RECOMBINATION
Replication of DNA; Repair of DNA; Recombination: homologous recombination and genetic diversity; Transposons and site-specific recombination; Technology to study gene functions in multicellular eukaryotic organism.

PART III. FROM DNA TO PROTEINS
Transcription; RNA structure; RNA processing; Translation; Protein folding and quality control process.

PART IV. GENE REGULATION
Gene structure and basic principles of gene regulation in eukaryotes; Epigenetic regulation.

Initial competences

General Biology; Basic principles of organic chemistry and biochemistry, and basic concepts of cell biology and molecular biology.

Final competences

1 Know and understand the structure and expression of eukaruotic genomes, epigenetic regulation, and genome stability.
2 Know and understand the structure and properties of DNA and RNA, and the molecular events involved in DNA synthesis, DNA repair and recombination, in pro- and eukaryotes.
3 Know and understand the genetic information flow in the eukaryotic cell; including the definition of a gene, the replication, the formation of RNA (transcription), the processing of pre mRNA, and the protein synthesis (translation), the regulation of gene expression.
4 Appreciate and understand the molecular biological concepts behind (simple) biotechnological applications.
5 Be familiar with the specific terminology and able to explain major concepts to expert as well as layman's audiences.
6 Be able to build further on current knowledge in the field by reading simple research papers and drawing relevant conclusions.

Conditions for credit contract

This course unit cannot be taken via a credit contract

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Practicum, Group work, Lecture, Seminar: practical pc room classes

Learning materials and price

Lecture notes and handouts of the PowerPoint slides will be provided.
Course book of the practical exercises will be available.

References

Molecular Biology of the Cell; B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts and P. Walter; Garland Science, New York.

Course content-related study coaching

Weekly office hours, during which the student can pass by for more information, will beanounced at the beginning of the course.
Feedback during permanent evaluation moments will be given.

Assessment moments

end-of-term and continuous assessment

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent assessment

Report, Participation, Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

The final exam will evaluate the knowledge and understanding of major concepts in molecular biology via open questions a well as figure questions.
The ability to connect major concepts will be assessed.
The ability to use the correct terminiology will be evaluated via short questions that ask for definitions or brief explanations of some important terms/concepts in molecular biology.

Calculation of the examination mark

Periodic evaluation = 16/20; non-periodic evaluation = 4/20
Students need to attend the practical sessions in order to pass the course.
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.