

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

Credits	5.0	Study time	150 h	Contact hrs	50.0 h
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Course offerings and teaching methods in academic year 2019-2020

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

Lecturers in academic year 2019-2020

Depuydt, Stephen	KR01	lecturer-in-charge
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Offered in the following programmes in 2019-2020

Bachelor of Science in Molecular Biotechnology	crdts	offering
	5	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 prokaryotes and 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 DNA; genome structure; chromatin and nucleosomes; genome biology and genome sequences.

PART II. DNA REPLICATION, REPAIR AND RECOMBINATION

Replication of DNA; mutability and repair of DNA; Recombination: homologous and site-specific recombination; Genome recombination in prokaryotes: plasmids, transformation, conjugation, transduction; DNA and retrotransposons.

PART III. FROM DNA TO PROTEINS

Transcription; RNA structure; RNA processing; Translation and localization of proteins.

PART IV. GENE REGULATION

Gene structure in prokaryotes and eukaryotes; Basic principles in gene regulation of prokaryotes; Basic principles in gene regulation of eukaryotes; Mutation in regulatory circuits.

Initial competences

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

Final competences

- 1 The student knows and understands the structure and properties of DNA and RNA, and the molecular events involved in DNA synthesis, DNA repair and recombination, in pro- and eukaryotes.

- 2 The student knows and understands the elementary principles and concepts of the molecular biology of bacteria and eukaryotes and has insight in gene structure, gene expression and gene regulation.
- 3 The student appreciates and understands the molecular biological concepts behind (simple) biotechnological applications
- 4 The student is familiar with the specific terminology and can explain major concepts to expert as well as layman's audiences
- 5 The student is able to use to acquired knowledge to solve problems in molecular biology and molecular genetics, and to use the theoretical knowledge for wet-lab experiments and correct analysis of experimental data.
- 6 *The student is 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

Group work, lecture, practicum, seminar: practical PC room classes

Learning materials and price

Written syllabus and handouts of the PowerPoint slides will be provided. Syllabus 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 be announced at the beginning of the course.
Feedback during permanent evaluation moments will be given.

Evaluation methods

end-of-term evaluation and continuous assessment

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

Written examination with open questions

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

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, assignment, report

Possibilities of retake in case of permanent evaluation

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 as well as figure questions.
The ability to connect major concepts will be assessed.
The ability to use the correct terminology 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.