GHENT UNIVERSITY

Course Specifications

From the academic year 2017-2018 up to and including the

Experimental Molecular Cell Biology (C002708)

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

Credits 3.0	Study time 80 h	Contact hrs	25.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	seminar: coached exercises	10.0 h
		lecture	15.0 h

Lecturers in academic year 2018-2019

Beyaert, Rudi	WE14	lecturer-in-charge
Afonina, Inna	WE14	co-lecturer
Staal, Jens	WE14	co-lecturer

Offered in the following programmes in 2018-2019	crdts	offering
Master of Science in Bioinformatics (main subject Systems Biology)	3	A
Master of Science in Biochemistry and Biotechnology	3	A
Exchange programme in Biochemistry and Biotechnology (master's level)	3	A
Exchange Programme in Bioinformatics (master's level)	3	A

Teaching languages

English

Keywords

Biomedical laboratory techniques, methods, concepts, cell culture, signal transduction, proteomics, genomics, cell biology, biochemistry, molecular biology

Position of the course

This course gives an overview of some advanced molecular and cell biological techniques that are frequently used in a modern biomedical laboratory, and therefore adds on the basic knowledge obtained from other courses in the field of cell biology, immunology, gene technology, biochemistry and molecular biology.
The aim of this course is to provide students with the understanding of the theoretical background and principles of some advanced molecular and cell biological methods, the advantages and disadvantages of some alternatives, and their use in a biomedical research laboratory. In this way the student should obtain sufficient strategic insight to set up an optimal experimental approach for a specific scientific question. Moreover, the student will acquire sufficient background to critically evaluate the techniques that are used in scientific publications and projects.
This course contributes to the following program competences: Ma.WE.BB.1.1 - Ma.WE.BB.1.5, Ma.WE.BB.2.1 - Ma.WE.BB.2.6, Ma.WE.BB.3.1 - Ma.WE.BB.3.6, Ma.WE.BB.4.1 - Ma.WE.BB.4.4, Ma.WE.BB.6.1 - Ma.WE.BB.6.5, Ma.WE.BB.7.RES.1 - Ma.WE.BB.7.RES.2

Contents

The following topics will be covered in classroom lectures (15 contact hours):
• Safety and good laboratory practice in cell culture facilities
• Use and comparison of reporter systems in signal transduction analysis (in vitro en in vivo)
• Methods for measuring mammalian cell proliferation, necrosis, apoptosis, autophagy
• Methods for measuring phagocytosis, lysosome fusion, antigen presentation
• Functional analysis of GTP-binding proteins in mammalian cells
• Functional analysis of phospholipase activity in mammalian cells
• Use, comparison and pitfalls of different methods for the identification and functional

characterisation of protein-protein interactions (co-immunoprecipitation, TAP-tag, two-hybrid and derivatives, phage display, protein arrays, SPA, BIACORE, FRET, ...)
• Detection and functional analysis of different posttranslational modifications (phosphorylation, prenylation, palmitoylation, ubiquitination, sumoylation, ...)
• Antisense, RNAi, and genome editing technologies (principles, strengths and weaknesses, applications).
• Scientific integrity: data repositories, publication integrity, image integrity

During the seminars (10 contact hours) the students will learn to design experimental approaches to answer a specific biological question or problem.

Initial competences

General knowledge in the field of cell biology, biochemistry, gene technology, genetics and molecular biology, and this at a level of a Bachelor in Biochemistry and Biotechnology.

Final competences

1 Sufficient knowledge in the theoretical background and principles of molecular celbiological techniques, alternatives, applications and advantages and disadvantages.
2 Set up or adapt the most suitable experimental strategy for a specific scientific question.
3 Critically evaluate projects and publications and the techniques that have been used in these.
4 Conduct research according to proper scientific integrity policies.

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, seminar: coached exercises

Extra information on the teaching methods

Participation in the seminars is obligatory.

Learning materials and price

A syllabus, powerpoint slides of the courses, and representative articles are available on Minerva. Language: English. Cost: 25 EUR.

References

Scientific research articles available on Minerva

Course content-related study coaching

The student has the opportunity to ask questions to the lecturer or assistent at the end of each lesson or during the seminars.
There is also continuous interaction possible via Minerva and e-mail.

Evaluation methods

end-of-term evaluation

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

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

One can not pass for this course in case of unfounded absence during the seminars.
Periodic: Besides general questions concerning the principles of techniques, also questions that aim to evaluate insight of the student to independently set up a suitable experimental approach for a specific scientific question, and the ability to correctly report the research results.

Calculation of the examination mark

First examination period: sum of marks obtained for the different questions; Second examination period: same as first period.