GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2018-2019

Transgenetics of Animal Model Organisms (C002738)

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

Credits	6.0	Study time	160 h	Contact hrs	50.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	English	seminar	20.0 h
		lecture	30.0 h

Lecturers in academic year 2018-2019

Libert, Claude	WE14	lecturer-in-charge
Vleminckx, Kris	GE31	co-lecturer

Offered in the following programmes in 2018-2019	crdts	offering
Master of Science in Bioinformatics (main subject Systems Biology)	6	A
Master of Science in Biochemistry and Biotechnology	6	A
Exchange programme in Biochemistry and Biotechnology (master's level)	6	A
Exchange Programme in Bioinformatics (master's level)	6	A

Teaching languages

English

Keywords

Manipulation, mutants, phenotyping, function, expression, mice, frogs, fish, worms, flies

Position of the course

This course will be given in the 1st Master Biochemistry & Biotechnology, section biomedical biotechology. The course builds further on the course Gene Technology /eukaryotes of the 3nd bachelor.
The aim is to teach the student different aspects of the most important animal model organisms, especially concerning the possibilities of genetic manipulation in order to answer questions related to gene function and expression.
The student will get in touch with several aspects of medicine (competention Ma.WE. BB.1.4), will learn to develop strategies to approach complex biological questions (competentions Ma.WE.BB.2.4, Ma.WE.BB.2.8, Ma.WE.BB.3.1 and Ma.WE.BB.3.4) and will be motivated to apply the technology to address problems of economical or social relevance (competention Ma.WE.BB.5.1).
This course also 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

General introduction of animal modelorganisms
The mouse as an experimental animal
Transgenic overexpression in mammals
homologous recombination in ES cells and mutagenesis
Conditionalmutagenesis
Random mutagenesis in mice
Functional genomics in other organisms
1. Zebrafish and Xenopus
- Forward genetics
- Functional genomics and Reverse genetics (RNA, DNA and Morpholino injections, transgenesis, CRISPR/Cas and TALEN mediated genome editing)
- Bioinformatics

- Applications (Research)

2. Drosophila
- Forward genetics (chemical mutagenesis, P-element insertion mutagenesis, screens)
- Reverse genetics (P-element excision, RNA interference, CRISPR/Cas9)
- Bioinformatics
- Applications (Research)

3. C. elegans
- Forward genetics (chemical mutagenesis, screens)
- Functional Genomis (RNA interference, TALEN and CRISPR/Cas9, -OMIS and systems biology applications)
- Bioinformatics
- Applications (Research)

Initial competences

Having followed with succes courses of genetics and gene technology, or acquired the competences aimed at in these courses in another way.

Final competences

1 The student will learn how to make a choice between the available animal model organisms to address a scientific problem.
2 The student will learn to develop strategies to address complex scientific problems using gene manipulation of animals.
3 The student will know which technologies are available to deal with the problem, which are the possibilities, but also the limitations.
4 The student will be motivated to use the available technology to approach problems of social and economical relevance.

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

Learning materials and price

Syllabus (in English) elektronically available as well as Powerpoint files of the lessons electronically available. Cost: 20 EUR

References

Key papers will be made available on Minerva.

Course content-related study coaching

Interactive via Minerva.
Private after appointment.

Evaluation methods

end-of-term evaluation

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

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

The exam is a written one, consisting of several theoretical questions (half of the points) and some exercises (other half of the points).

Calculation of the examination mark

50% partim mammalia (Prof. Libert)
50% partim non-mammalia (Prof. Vleminckx)