Course Specifications
Valid as from the academic year 2019-2020

Transgenetics of Animal Model Organisms (C002738)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
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<tbody>
<tr>
<td>6.0</td>
<td>160 h</td>
<td>50.0 h</td>
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Course offerings and teaching methods in academic year 2019-2020

A (semester 2) English seminar 20.0 h

Lecturers in academic year 2019-2020

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

Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>crdts</th>
<th>offering</th>
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<td>6</td>
<td>A</td>
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Master of Science in Teaching in Science and Technology (main subject Biochemistry and Biotechnology)
Master of Science in Bioinformatics (main subject Systems Biology)
Master of Science in Biochemistry and Biotechnology
Exchange programme in Biochemistry and Biotechnology (master's level)
Exchange Programme in Bioinformatics (master's level)

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 biotechnology. The course builds further on the course Gene Technology /eukaryotes of the 3rd 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 model organisms
The mouse as an experimental animal
Transgenic overexpression in mammals
homologous recombination in ES cells and mutagenesis
Conditional mutagenesis
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)

(Approved)
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 Genornis (RNA interference, TALEN and CRISPR/Cas9, -OMIS and
  systems biology applications)
• Bioinformatics
• Applications (Research)

Initial competences
Having followed with success 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) electronically available as well as Powerpoint files of the lessons
electronically available. Cost: 20 EUR

References
Key papers will be made available on Ufora.

Course content-related study coaching
Interactive via Ufora.
Private after appointment.

Evaluation methods
de-ex-ort- 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)

(Approved)