Course Specifications
Valid as from the academic year 2020-2021

Due to Covid 19, the education and evaluation 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 3.0  Study time 80 h  Contact hrs 25.0 h

Course offerings and teaching methods in academic year 2020-2021
A (semester 2)  English  Gent  lecture 15.0 h
  seminar 10.0 h
  online lecture 0.0 h
  online seminar 0.0 h

Lecturers in academic year 2020-2021
Savvides, Savvas
WE10  lecturer-in-charge

Offered in the following programmes in 2020-2021

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<tr>
<th>Programme</th>
<th>Crds</th>
<th>Offering</th>
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<tbody>
<tr>
<td>Master of Science in Teaching in Science and Technology (main subject Biochemistry and Biotechnology)</td>
<td>3</td>
<td>A</td>
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<tr>
<td>Master of Science in Bioinformatics (main subject Systems Biology)</td>
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<td>A</td>
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<tr>
<td>Master of Science in Biochemistry and Biotechnology</td>
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<td>A</td>
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<tr>
<td>Exchange programme in Biochemistry and Biotechnology (master's level)</td>
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Teaching languages
English

Keywords

Position of the course
- The course aims to expose the student to the principles that underlie molecular interactions in biological systems in terms of the affinity and specificity of binding in the context of protein-drug interactions. These concepts are approached from a thermodynamic, kinetic, and structural perspective, and in particular how they relate to the physicochemical properties of water as a universal solvent. Through well chosen case-studies the course will demonstrate the practical applications of such detailed molecular knowledge in structure-based drug design, protein engineering and design, and protein-based therapeutics (antibody and non-antibody protein scaffolds). Finally the course covers the main methods currently used in the development of small-molecule and protein-based therapeutics.

This course contributes to the following program competences: Ma.WE.BB.1.1; Ma.WE.BB.1.2; Ma.WE.BB.1.4; Ma.WE.BB.1.5; Ma.WE.BB.2.1; Ma.WE.BB.2.2; Ma.WE.BB.2.6; Ma.WE.BB.3.5; Ma.WE.BB.4.2; Ma.WE.BB.7.RES.1, Ma.WE.BB.7.RES.2

Contents
- ITC and SPR: Historical background. Instrumentation and Principles of measurement. Experimental design. Data analysis. Informational content of ITC/SPR data. Case studies: (1) Specificity of Citrate binding to the Histidine Autokinase CitA receptor. (2) Structural and thermodynamic basis for the emergence of drug

(Approved)
resistance. HIV protease inhibitors
- Protein-Protein interactions: Introduction and overview. Optimization of interacting surfaces. SPR in determining kinetic binding constants kon and koff. Case study: Receptor-cytokine interactions
- Therapeutic targeting of protein-protein interactions

Initial competences
- Biochemistry, structure-function relationships of proteins, enzymology

Final competences
1. To obtain insights into the process of therapeutic compounds.
2. To obtain insights into the forces, thermodynamics, and kinetics of (bio)molecular binding.
3. To obtain insights into protein engineering in the context of biotechnology and drug-design.
4. To obtain insights into protein engineering, and protein-based therapeutics.
5. To be able to critically read research articles in the field of protein engineering and structure-based drug design.

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, online discussion group, seminar, online lecture, online seminar

Extra information on the teaching methods
COVID-19
Due to the corona virus crisis changes in the specified teaching modes might apply, e.g. Online lectures, lecture recordings etc.

Learning materials and price
- Slides, review- and research articles via Ufora
- Cost: 10 EUR

References
- X

Course content-related study coaching
- Appointment with the lecturer

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, written examination, open book examination, assignment

Examination methods in case of periodic evaluation during the second examination period
- Written examination with open questions, written examination, open book examination, assignment

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 will be completed independently by each student against a specified deadline and will be submitted online according to specified instructions and format.

Calculation of the examination mark
- written exam: 100%

(Approved)