Course Specifications
Valid as from the academic year 2020-2021

Structural Bioinformatics (C003526)

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)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
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<tr>
<td>3.0</td>
<td>80 h</td>
<td>25.0 h</td>
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Course offerings and teaching methods in academic year 2020-2021

A (semester 1) English Gent

| seminar: practical PC room classes | 10.0 h |
| lecture | 20.0 h |
| online lecture | 0.0 h |
| online seminar: practical PC room classes | 0.0 h |

Lecturers in academic year 2020-2021

Savvides, Savvas WE10 lecturer-in-charge

Offered in the following programmes in 2020-2021

| Master of Science in Teaching in Science and Technology (main subject Biochemistry and Biotechnology) | 3 | A |
| 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 |

Teaching languages

English

Keywords

Secondary structure determination, structure prediction, hybrid methods in structural biology, structure quality validation, molecular visualization, structural databases, molecular docking, force fields, molecular dynamics, structural bioinformatics.

Position of the course

This course will give an overview of the field of structural bioinformatics. This field studies the structure and function of proteins.

This course contributes to the following program competences: Ma.WE.BB.1.2, Ma.WE.BB.1.3, Ma.WE.BB.2.5, Ma.WE.BB.2.6

Contents

- Protein sequence alignments, homology, classification, protein families.
- Structure superposition and comparision.
- Prediction of three-dimensional protein structure
  - Homology modeling
  - Fold recognition
  - Ab initio
- Quality of protein structures
  - Quality indicators of experimentally determined macromolecular structures via X-ray crystallography, electron-microscopy, NMR etc.)
  - Quality control of structures and Errors in protein structures
- Secondary structure prediction
- Secondary structure preferences of amino acids
- First, second and third generation algorithms
- Transmembrane helix prediction
- Integrateive methods in structural biology
- Structural databases

(Approved)
• Introduction to molecular docking and dynamics

Initial competences
  Basic knowledge of molecular biology
  Basic knowledge of bioinformatics
  Basic knowledge of structural biology is a plus

Final competences
  1 Have a perspective of the largest research domains in structural bioinformatics and the problems that pose themselves.
  2 Have insight in the concepts used by the different algorithms in structural bioinformatics.
  3 To be able to identify and apply appropriate online tools, software, and approaches to analyze protein structures and sequences towards research in biochemistry, biotechnology, and structural biology.

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: practical PC room classes, online lecture, online seminar: practical PC room classes

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
  • Lecture materials via UFORA
  • Online resources and software
  • Lecture recordings

References

Course content-related study coaching
  Weekly office-hour

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, open book examination

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 will assume a 'take-home' format.
  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)