Course Specifications
Valid as from the academic year 2020-2021

Bioinorganic Chemistry (C004150)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time 120 h</th>
<th>Contact hrs 52.5 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
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</tbody>
</table>

Course offerings and teaching methods in academic year 2020-2021

A (semester 2)  English  Gent  self-reliant study activities  30.0 h
lecture  22.5 h

Lecturers in academic year 2020-2021

Van Hecke, Kristof  WE06  lecturer-in-charge

Offered in the following programmes in 2020-2021

<table>
<thead>
<tr>
<th>Programme</th>
<th>crdts</th>
<th>offering</th>
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</thead>
<tbody>
<tr>
<td>Master of Science in Teaching in Science and Technology (main subject Chemistry)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Master of Science in Chemistry (main subject Materials and Nano Chemistry)</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Exchange Programme in Chemistry (master's level)</td>
<td>4</td>
<td>A</td>
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</tbody>
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Teaching languages

English

Keywords

Bioinorganic chemistry, metals in biochemistry, metalloproteins, DNA interaction, therapeutics, probes and diagnostics, biomimetics, biomineralization.

Position of the course

A short history and overview of metals in biological systems is given. The interaction between metal ions and their complexes and biomolecules such as proteins and DNA are studied. The focus is on the structure-function relationship of metal complexes as therapeutics, probes and diagnostics. An introduction to biomimetic chemistry and catalysis is given, together with the concepts of biomineralization.

Contents

• The role of metals in biological systems
• Biochemical aspects and biodistribution of metal ions
• Methods to study metals in biology
• Biological ligands for metal ions
• Metalloproteins and enzymes: model complexes
• Interaction of metal-complexes with nucleic acids
• Metal complexes in medicine: diagnostic probes and therapeutics
• Biomimetic chemistry and catalysis
• Artificial nucleases and peptidases
• Biomineralization

Initial competences

A general knowledge on biochemical and structural aspects of biomolecules (proteins, DNA, RNA), as well as fundamental knowledge of structural analyses techniques (NMR spectroscopy, XRD analysis) in accordance with the bachelor program of Chemistry is mandatory.

Final competences

1. The student gains insight into the role of metal ions in biological systems, and can relate this to the physical and chemical properties of these metals.
2. The student gains insight into the structure-function relationship of metal complexes and their interaction with biomolecules.

(Approved)
3 The student gains insight into the design of metal complexes as therapeutics and diagnostic probes.
4 The student understands the key concepts of biomimetics and biomineralization.

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, self-reliant study activities, online lecture.

Extra information on the teaching methods
Lectures, individual assignment.
Because of COVID19 changed working methods can be rolled out when proven necessary.

Learning materials and price
• Keynote presentations (Ufora)
• Papers and book chapters from recent literature

References

Course content-related study coaching
• Interactive support via Ufora, or through interaction with lecturer and co-workers during lectures.
• Personal support for the self-reliant work by lecturer and co-workers, via email and appointment.

Evaluation methods
end-of-term evaluation.

Examination methods in case of periodic evaluation during the first examination period
Assignment, report.

Examination methods in case of periodic evaluation during the second examination period
Assignment, report.

Examination methods in case of permanent evaluation.

Possibilities of retake in case of permanent evaluation
not applicable.

Extra information on the examination methods
Self-reliant work (individual assignment): research/literature study and elaboration.
Research topic within bioinorganic chemistry on the basis of recent publications, presentation and defense.
Because of COVID19 changed evaluation methods can be rolled out when proven necessary.

Calculation of the examination mark
100% self-reliant work – presentation – defense.

(Approved)