Course
Specifications
Valid in the academic year 2018-2019

Imaging Techniques of consolidated and unconsolidated Sediments
(C003693)

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>176 h</td>
<td>74.0 h</td>
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</tbody>
</table>

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)  English  lecture  25.0 h  practicum  38.75 h  integration seminar  10.0 h

Lecturers in academic year 2018-2019

Cnudde, Veerle  WE13  lecturer-in-charge

Offered in the following programmes in 2018-2019

<table>
<thead>
<tr>
<th>Programmes</th>
<th>crds</th>
<th>offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Geology</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Master of Science in Geology</td>
<td>6</td>
<td>A</td>
</tr>
<tr>
<td>Exchange programme in Geology (master's level)</td>
<td>6</td>
<td>A</td>
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</tbody>
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Teaching languages

English

Keywords

Digital imaging techniques, optical microscopy, SEM/EDX, FIB/SEM, XRF, XAS, X-ray and neutron CT, image processing and analysis

Position of the course

The aim of the course is to provide the students with an overview of a selection of imaging techniques which can be used to study rocks both structurally as well as chemically. Attention will be given towards a realistic outcome of the use of these techniques in order to answer specific geological questions. Important recent developments in these technologies will be discussed and illustrations will be given on how these techniques can be applied to solve geological problems.

Contents

- Basic principles of digital thin section analysis by optical microscopy, including image processing (preparing images for measurements) and 2D image analysis.
- Basic principles and different imaging and analytical modes of SEM; SEM/EDX and its use as mineral liberation analyser; Combined focused ion beam/SEM-TEM techniques: advanced tools to resolve microstructures and mineral phases in rocks; ESEM
- Chemical imaging by XRF and X-ray absorption spectroscopy (XAS) using synchrotron radiation.
- X-ray computed tomography: in laboratory and at synchrotron facilities
- Neutron computed tomography

Initial competences

The student has a basic knowledge in geology, sedimentology, mineralogy, petrology and optical mineralogy & petrography.

Final competences

1. A general understanding of the concepts and processes which are occurring, when using one of the discussed imaging techniques.
2. Developing a research plan for the structural and chemical investigation of a rock.
3. Critically and scientifically report experimental results and characterization data.

Conditions for credit contract

(Approved)
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, integration seminar, practicum.

Learning materials and price
Course notes and documentation, photocopies of relevant study material will be spread by minerva as well as references to text books and literature.

References
Brandon D., Kaplan, W., 2008. Microstructural Characterization of Materials

Course content-related study coaching
Theory: interaction during lectures. Possibility to ask lecturer (or assistant) questions in person and by e-mail.
Practice and seminars: guidance and feed-back during the practice and seminars.
Interactive support by Minerva (emails).
Personal contact after appointment.

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, assignment, job performance assessment.

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions.

Examination methods in case of permanent evaluation
Assignment, job performance assessment.

Possibilities of retake in case of permanent evaluation
not applicable.

Calculation of the examination mark
Written examination with open questions: 80 %
Assignment + evaluation during the year 20%.