

Guideline for the study program in Materials Chemistry and Mineralogy

The study program is divided into two profiles, chemistry and mineralogy. The choice of the profiles depends on the choice of modules as listed below:

1st semester	Analytical Methods I 6 CP	Mineralogy 6 CP	Crystallography 6 CP	Chemistry 6 CP	Materials Science 6 CP
2nd semester	Analytical Methods II 6 CP	Profile Chemistry: 30-42 CP selected from chemistry modules, including at least one of the two chemistry research modules. 6-18 CP from mineralogy modules Profile Mineralogy: 30-42 CP selected from mineralogy modules, including the mineralogy research module. 6-18 CP from chemistry modules			
3rd semester	General Studies 6 CP				
4th Semester	Master thesis 30 CP				

Modules listed in white fields are mandatory for all students in both profiles

In 2nd and 3rd semesters the choice is different for chemistry and mineralogy modules

Chemistry: 30 CP from chemistry profile and 18 CP from mineralogy profile, or
36 CP from chemistry profile and 12 CP from mineralogy profile, or
42 CP from chemistry profile and 6 CP from mineralogy profile

Mineralogy: 30 CP from mineralogy profile and 18 CP from chemistry profile, or
36 CP from mineralogy profile and 12 CP from chemistry profile, or
42 CP from mineralogy profile and 6 CP from chemistry profile

Students have to enroll for every lecture via StudIP.

Exams will be offered every semester for all modules

Students have to register every semester again for exams via StudIP. In winter term by January 10, in summer term by June 30, or (if the exam takes place before the respective deadline) not later than two days before the date of the exam. Registration is for the module and not for a single lecture.

Students not registered for an exam are not admitted to the exam.

This applies to reexaminations as well. They will be offered every term, winter and summer. Students should contact the module representative to get information on date and organization.

Medical certifications for illness have to be presented to our examination office.

Description of modules, black = mandatory, red = elective course chemistry, blue = elective course mineralogy

1st semester:

05-MCM-1-P1 Analytical methods I, module representative: Michael Wendschuh

This module comprises several units of analytical training in various methods. A theoretical introduction is combined with a practical demonstration or exercise for each of the methods discussed (several lecturers).

Final grade: written exam, short written reports for some sections (not graded)

05-MCM-1-P2 Mineralogy, module representative: Andreas Lüttge

comprising two lectures

- Introduction to Mineralogy (Andreas Lüttge)
- Thermodynamics, kinetics, and phase equilibria (Andreas Lüttge)

Final grade: written exam

05-MCM-1-P3 Crystallography, module representative: Reinhard X. Fischer

comprising two lectures with exercises

- Introduction to crystallography + tutorial (Reinhard X. Fischer)
- X-ray diffraction & Rietveld analysis (Johannes Birkenstock)

Final grade: written exam (80%), written report X-ray diffraction (20%)

05-MCM-1-P4 Chemistry, module representative: Marcus Bäumer

comprising three lectures

- Surfaces and interfaces (Marcus Bäumer)
- Solid state chemistry (Thorsten Gesing)
- Solid state physics (Volkmar Zielasek)

Final grade: ...

05-MCM-1-P5 Materials science, module representatives: Reinhard X. Fischer, Andreas Lüttge
comprising two lectures and one lab

- Introduction to materials science (Rolf Arvidson)
- Interpretation of phase diagrams (Reinhard X. Fischer)
- Experiments to phase reactions (Michael Wendschuh)

Final grade: written exam, written report (not graded)

2nd semester

05-MCM-2-P6 Analytical methods II, module representative: Michael Wendschuh

This module is an enhancement of part I. It comprises several units of analytical training in further methods (several lecturers).

A theoretical introduction is combined with a practical demonstration or exercise for each of the methods discussed.

Final grade: written exam, short written reports for some sections (not graded)

05-MCM-2-W1M Crystal structure analysis, module representative: Reinhard X. Fischer comprising one lecture with exercises, and one lab

- Crystal structure analysis and crystal chemistry (Reinhard X. Fischer)
- Single crystal diffraction (Johannes Birkenstock)

Final grade: oral exam, written report (not graded)

05-MCM-2-W2M Physical properties of crystals, module representative: Reinhard X. Fischer comprising two lectures with exercises, and one lab

- Introduction to crystal physics (Johannes Birkenstock)
- Crystal optics (Reinhard X. Fischer)
- Determination of refractive indices (Reinhard X. Fischer)

Final grade: written exam

05-MCM-2-W3M Functional ceramics, module representative: Kurosch Rezwani comprising two lectures

- Bioceramics (Kurosch Rezwani, Michael Maas)
- Characterization of Material Surfaces for biotechnological applications (Daniel Rioja, Dorothea Brüggemann, Kurosch Rezwani)

Final grade: oral exam

Note that bioceramics is generally presented in German language but might be individually given in English. Please check before choosing this module.

05-MCM-2-W4M Minerals and Materials, module representative: Andreas Lüttge comprising two lectures with seminar

- Mineral surfaces and reactions (Andreas Lüttge)
- Materials Resources (Christoph Vogt) with seminar presentation

Final grade: written exam

05-MCM-2-W1C Solid state synthesis, module representative: Thorsten M. Gesing comprising one seminar and one lab

- Solid state reactions (Thorsten M. Gesing)
- Solid state synthesis and identification (Thorsten M. Gesing)

Lab work is organized as whole-day practicals right after the lecture period.

Note that this is an advanced chemistry course requiring basic skills in chemistry lab work.

Admission to lab work after passing initial test

Final grade: written report

05-MCM-2-W2C Structure property relationship, module representative: Thorsten M. Gesing comprising one lecture and one seminar

- Structure property relations (Mangir Murshed, Thorsten M. Gesing)
- Structure property relations seminar (Mangir Murshed, Thorsten M. Gesing)

Final grade: ...

05-MCM-2-W3C Surface chemistry and catalysis, module representative: Marcus Bäumer comprising two lectures and one excursion

- Heterogeneous catalysis (Marcus Bäumer)
- Vacuum and cryotechnics (Sebastian Kunz, Marcus Bäumer)
- Excursion (Marcus Bäumer)

Final grade: ...

05-MCM-2-W4C Functional surfaces

This module is not offered anymore. Its contents is integrated into module technical chemistry

05-MCM-2-W5C Technical chemistry, module representative: Andreas Lüttge comprising two lectures with exercises

- Functional surfaces (Andreas Lüttge)
- Technical chemistry (Florian Kuhnen)

Final grade: written exam

3rd semester

05-MCM-3-P7 General studies, module representative: Reinhard X. Fischer comprising one compulsory course and one programming class

(1) Compulsory course

This course can be chosen from the general study program of university with topics not covered by our study program, typically, e.g., language courses, philosophy, history, art, or equivalent.

This course is not graded. However, a confirmation of participation must be sent to the module representative, currently Reinhard X. Fischer

(2) Programming class

Lecture and exercises are offered by Thomas Messner, using Delphi as powerful programming language. The students have to write a program on a specific topic which is graded after submission to the lecturer and defending its contents in a discussion round. There will be a final deadline for submitting the programming project. If the deadline is missed, a new programming project with a new topic has to be submitted at the next deadline.

Grades will only be sent to our examination office if the programming project has been successfully finished and the participation in the compulsory course is documented.

05-MCM-3-W5M Petrology and isotope geochemistry, module representative: Simone Kasemann comprising two lectures

- Mineral deposits and isotope geochemistry (Simone Kasemann)
- Sedimentary petrology (NN) or equivalent

05-MCM-3-W6M Technical ceramics, module representative: Kurosch Rezwan comprising one lecture and one lab

- Ceramics lab (Kurosch Reuzwan) register at the beginning of the lecture period
- Ceramic nanotechnology (Michael Maas, Kurosch Rezwan)

Final grade: oral exam
Note that ceramic nanotechnology is generally presented in German language but might be individually given in English. Please check before choosing this module.

05-MCM-3-W7M Special topics in materials science, module representative: Reinhard X. Fischer comprising two lectures and lab

- Nanoparticles and nanotechnology (Suman Pokhrel)
- Zeolites, catalysts, and ion exchange (Reinhard X. Fischer, Michael Fischer)
- Zeolite synthesis and characterization (Iris Spieß)

Final grade: Oral exam

05-MCM-3-W8M Building materials, module representative: Andreas Lüttge comprising one lecture and one excursion

- Building materials (Andreas Lüttge, Michael Wendschuh, NN)
- Excursion (Michael Wendschuh)

Final grade: ...

The following research modules need a written registration sent to the head of the examination committee (currently Reinhard X. Fischer). The form is available on the website www.geo.uni-bremen.de, education, MMCM, research modules.

05-MCM-3-W9M Research module mineralogy, module representative: Reinhard X. Fischer comprising research project corresponding to 12 CP.
Students can do the project with a supervisor listed as lecturer in one of the mineralogy modules listed above. Other projects and supervisors need the written permission by the examination committee after sending a proposal to the head of the committee (currently Reinhard X. Fischer) and approval by the module representative.

05-MCM-3-W6C Research module chemistry I, module representative: Thorsten M. Gesing comprising research project corresponding to 12 CP.
Students can do the project with a supervisor listed as lecturer in one of the chemistry modules listed above. Other projects and supervisors need the written permission by the examination committee after sending a proposal to the head of the committee (currently Reinhard X. Fischer) and approval by the module representative.

05-MCM-3-W7C Research module chemistry II, module representative: Marcus Bäumer comprising research project corresponding to 12 CP.
Students can do the project with a supervisor listed as lecturer in one of the chemistry modules listed above. Other projects and supervisors need the written permission by the examination committee after sending a proposal to the head of the committee (currently Reinhard X. Fischer) and approval by the module representative.

05-MCM-4-M-1 Master thesis

Students can do the master thesis with a supervisor listed as lecturer in one of the mineralogy or chemistry modules listed above, dependent on the choice of profile. Other topics and supervisors need the written permission by the examination committee after sending a proposal to the head of the committee (currently Reinhard X. Fischer). 60 CP are needed to register for the master thesis.

The registration form is available under www.geo.uni-bremen.de, education, MMCM, master thesis, downloads.