



Faculty of Health, Science and Technology
Materials Engineering

Syllabus

Materials characterisation

Course Code:	MTAD23
Course Title:	Materials characterisation <i>Karaktärisering av material</i>
Credits:	7.5
Degree Level:	Master's level
Progressive Specialisation:	Second cycle, has only first-cycle course/s as entry requirements (A1N)

Major Field of Study:
MTA (Mechanical Engineering)

Course Approval

The syllabus was approved by the Faculty of Health, Science and Technology 2022-08-31, and is valid from the Autumn semester 2023 at Karlstad University.

Prerequisites

Registered for Matter, 7.5 ECTS credits, Materials Engineering, 7.5 ECTS credits, and Manufacturing Technology, 7.5 ECTS credits, plus upper secondary level Swedish 3 or Swedish as a second language 3 and English 6, or equivalent

Learning Outcomes

The aim of the course is for students to acquire basic theoretical and practical knowledge of modern methods of materials characterisation used in industrial and academic research and development work. The course provides a valuable basis for further study in other MA-level courses in Materials Engineering.

Upon completion of the course, students should be able to:

- explain the physical principles of the methods studied in the course, how the methods work, what type of results can be achieved for each method, and the demands placed on samples

and sample preparation,

- identify the form in which results can be achieved for each method (diagrams, diffraction patterns, microstructure images, and so on), and how to interpret the results in practice,
- describe the procedure used to produce for instance IT diagrams, CCT diagrams, and phase diagrams, and
- suggest what methods to use to solve a given problem, justify their choice, and explain what type of results can be expected.

Content

The course comprises several parts, one for each method. Instruction is in the form of teaching sessions, demonstrations of equipment, and a mandatory laboratory project. Participation in projects, demonstrations, and laboratory sessions is mandatory. The methods covered are light, scan, and transmission electron microscopy, diffraction methods, and other modern methods of analysis.

Reading List

See separate document.

Examination

Assessment is based on an individual written exam, a mandatory laboratory project presented orally and in writing, and mandatory participation in demonstrations and laboratory sessions.

If students have a decision from Karlstad University entitling them to Targeted Study Support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

Grades

One of the grades 5 (Pass with Distinction), 4 (Pass with Some Distinction), 3 (Pass), or U (Fail) is awarded in the examination of the course.

Quality Assurance

Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

Course Certificate

A course certificate will be provided upon request.

Additional information

The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.