

Mathematics in studies of societal challenges, 3 credits

Matematik i studier av samhällsutmaningar, 3 högskolepoäng

Course code:	FOUK026
Third-cycle subject:	Mathematics/applied mathematics
School:	School for Education, Culture and Communication
Valid from:	Autumn term 2024
Established by:	Dean of the School
Decision date:	2024-03-12
Last modified:	--
Level of education:	Third cycle level
Swedish version	Yes

Course objective

The objective of the course is to give doctoral students an introduction to mathematical problems and methods that are relevant for research directed towards various societal challenges, and to prepare them for being able to participate in such research.

Course content

- research that addresses a number of societal challenges
- mathematical problems and methods that are relevant for such research
- models for interdisciplinary research

Intended learning outcomes

After passing the course the doctoral student should be able to

1. give an account of how mathematics is used in research on various societal challenges
2. formulate a plan for a research project that involves several disciplines and has relevance for some societal challenge

The intended qualitative targets in relation to the Higher Education Ordinance, appendix 2.

Knowledge and understanding

For the Degree of Doctor, the doctoral student shall demonstrate:

- A1: broad knowledge and systematic understanding of the research field as well as advanced and up-to-date specialised knowledge in a limited area of this field, and
- A2: familiarity with research methodology in general and the methods of the specific field of research in particular.

Competence and skills

For the Degree of Doctor, the doctoral student shall demonstrate:

- B1: the capacity for scholarly analysis and synthesis as well as to review and assess new and complex phenomena, issues, and situations autonomously and critically,
- B2: the ability to identify and formulate issues with scholarly precision critically, autonomously, and creatively, and to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work,
- B4: the ability in both national and international contexts to present and discuss research and research findings authoritatively in speech and writing and in dialogue with the academic community and society in general,
- B5: the ability to identify the need for further knowledge, and
- B6: the capacity to contribute to social development and support the learning of others both through research and education and in some other qualified professional capacity.

Judgement and approach

For a Degree of Doctor the doctoral student shall demonstrate

- C2: specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.

Teaching formats

Lectures and seminars.

Examination

OBN, Compulsory attendance, 1 credit, concerning learning outcome 1, grade Fail (U) or Pass (G)

SEM, Seminar, 1 credit, concerning learning outcomes 1 and 2, grade Fail (U) or Pass (G)

GRU, Group assignment, 1 credit, concerning learning outcome 2, grade Fail (U) or Pass (G)

Grade

Two-grade scale, fail (U) or pass (G).

Requirements

Registered as a doctoral student.

Selection criteria

1. Doctoral students in mathematics/applied mathematics at Mälardalen University
2. Doctoral students at Mälardalen University
3. Doctoral students at other universities in Sweden
4. Doctoral students at higher education institutions outside Sweden