The Faculty of Health, Science and Technology
Mathematics

Syllabus

Didactical aspects of students' mathematics learning in programming

Course Code:	7MAT008
Course Title:	Didactical aspects of students' mathematics learning in programming *Didaktiska aspekter på elevers matematiklärande inom programmering*
Subject:	Mathematics
Credits:	7.5
Education Cycle:	Third cycle

Syllabus Approval
The syllabus was approved by the Faculty of Arts and Social Sciences on 31 May 2023 and is in effect starting the autumn semester 2023 at Karlstad University.

Language of Instruction
The language of instruction is Swedish/English. If there are students who do not speak Swedish, English will be the language of instruction.

Entry requirements and selection
The student is admitted to the doctoral programme in either Mathematics, Mathematics Education, or Educational Work. The course is aimed primarily at doctoral students at Karlstad University, and secondarily at doctoral students at other universities.

Learning Outcomes
Upon completion of the course, the doctoral student should be able to:

- Conduct a systematic literature review
- Describe fundamental terminology and theory related to students learning programming
- Describe how learning programming is both connected to, and separate from, learning mathematics

Course content
The course includes a selection of theories, as agreed upon by the examiner and the doctoral student, regarding how students learn programming, as well as how this relates to learning mathematics. The course is conducted mainly through independent studies, with instructions from the examiner.
A key element of the course is conducting a systematic literature review.

Reading List
See separate document.

Examination
Students are assessed via a written assignment as well as an oral exam based on the written assignment.

Grades
One of the grades Pass (G) or Fail (U) is awarded in the examination of the course.

Quality Assurance
A written evaluation is performed after the end of the course. The result of the evaluation is collated and made available in accordance with *The Higher Education Ordinance*, Chapter 1 Section 14.

Course Certificate
Course certificates are issued upon request.

Goal Matrix

The course contributes to partial fulfilment of the goals marked with an X below.

	Doctor			Licentiate	
	Knowledge and understanding			**Knowledge and understanding**	
1a	Broad knowledge and systematic understanding of the research field		1a	Demonstrate knowledge and understanding of the research field	
1b	Advanced and up-to-date specialised knowledge in a limited area of this field	x	1b	Current specialist knowledge in a limited area of this field	x
1c	Familiarity with research methodology in general and the methods of the specific field of research in particular	x	1c	Specialised knowledge of research methodology in general and the methods of the specific field of research in particular	x
	Competence and skills			**Competence and skills**	
2a	Capacity for scholarly analysis and synthesis as well as	x	2a	Demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively	
2b	to review and assess new and complex phenomena, issues and situations autonomously and critically	x	2b	plan and use appropriate methods to undertake a limited piece of research and other qualified tasks within predetermined time frames in order to contribute to the formation of knowledge	
3a	demonstrate the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively, and to		2c	as well as to evaluate this work,	
3b	plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames and to review and evaluate such work		3a	demonstrate the ability in both national and international contexts to present and discuss research and research findings in speech and writing and in dialogue with the academic community and	
4	demonstrate through a dissertation the ability to make a significant contribution to the formation of knowledge through his or her own research		3b	society in general	
5a	demonstrate 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		4	demonstrate the skills required to participate autonomously in research and development work and to work autonomously in some other qualified capacity.	

5b	society in general					
6	demonstrate the ability to identify the need for further knowledge and	x				
7	demonstrate 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				**Judgement and approach**	
8a	Demonstrate intellectual autonomy and disciplinary rectitude as well as			5	demonstrate the ability to make assessments of ethical aspects of his or her own research	
8b	the ability to make assessments of research ethics, and			6	demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used	
9	demonstrate specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used.			7	demonstrate the ability to identify the need for further knowledge and take responsibility for his or her ongoing learning.	x