



Course syllabus

Board of Education Science

School of Computer Science, Physics and Mathematics

2GN003 Matematik och matematikdidaktik I, för undervisning i årskurs 4-6, 15 högskolepoäng

2GN003 Mathematics and mathematics education I for teaching in primary school, directed towards year 4-6, 15 credits

Main field of study

Mathematics

Subject Group

Mathematics

Level of classification

First Level

Progression

G2F

Date of Ratification

Approved by School of Computer Science, Physics and Mathematics 2012-08-17
The course syllabus is valid from spring semester 2013

Prerequisites

- 1GN001 The history of education, its value base and social conditions, pre-school class and primary school, year 1 to 6; 7.5 credits
- 1GN003 UVK-course: Development and Learning for Primary Teachers; 7.5 credits
- 1GN010 UVK-course: Social relations, Conflict Management and Leadership, Primary Teachers; 7.5 credits and
- Specialization year 1-3: 1GN009 Work-based education in primary school, Pre-school class and years 1-3; 7.5 credits. Specialization year 4-6: 1GN012 Work-based education in primary school, years 4-6, period I; 7.5credits

Objectives

Common expected learning outcomes

After completing the course students will be able to:

- discuss and explain the role of the steering documents in mathematics education and through a so-called educational planing show how to work with it in

mathematics education

- plan, implement, analyze and evaluate different forms of learning activities for primary school year 4-6 linked to the framework of mathematical skills
- reflect on theories of learning to see the link between skills, mathematics content and methods in mathematics education in year 4-6 and apply this knowledge practically to meet and develop students' abilities and learning
- know and be able to describe stage relevant research from mathematics education which can be related to mathematics instruction in year 4-6.

Otherwise, the objectives for each module are listed below.

Module 1; 7.5 hp

After completing this module the students will be able to:

- demonstrate advanced knowledge of and correctly use basic school mathematics with a focus on arithmetic (natural numbers, integers, rational numbers), numbers and spatial perception, number use, and concepts of mathematics
- apply knowledge of arithmetic (natural numbers, integers, rational numbers), numbers and spatial perception, number use, and concepts in mathematics in didactic activities with a focus on year 4-6
- be able to describe how students in pre-school up to year 3 develop their number perception and be able to build on this knowledge in year 4-6,
- explain how mathematics in year 4-6 is the underlying mathematics of 7-9 with respect to the modules elements
- to account for various factors on students' desire and ability to learn mathematics
- explain and apply different forms of representation and working methods in mathematics presented in this module
- explain overall character of the development of mathematics and the history of ideas for this modules math elements.

Module 2; 7.5 credits

After completing this module the students will be able to:

- demonstrate a thorough knowledge of and be able to use primary school mathematics with a focus on geometry, algebra, statistics, probability, regression and change
- apply knowledge of primary school mathematics with a focus on geometry, algebra, statistics, probability, regression and change in didactic activities with a focus on year 4-6
- describe how preschool up to year 3 mathematics is dealt with in relation to the modules elements and be able to build on this knowledge in year 4-6
- explain how mathematics in year 4-6 is the underlying mathematics of 7-9 with respect to this modules elements
- explain and apply different forms of representation and working methods in mathematics from this modules elements
- explain overall character of the development of mathematics and the history of ideas for this modules math elements.

Content

Module 1

The module addresses the student's own math skills in arithmetic, with a focus on number perception and number usage and concepts and building of concepts in

mathematics combined with didactic perspective relevant to activities in year 4-6. The mathematical content discussed in relation to the abilities that form the basis of the primary school curriculum in mathematics. These abilities linked to mathematics content and the whole is highlighted by focusing on different approaches and strategies to support numbers and concept development. It also deals with factors affecting mathematics teaching in school and giving the desire and opportunity to learn mathematics. Mathematics subject characteristics and historical development are highlighted in a comprehensive, school-oriented perspective with a focus on mathematical constructs and ideas. Mathematics education as a research field is illustrated by studies of research articles relevant to primary school mathematics.

Module 2

The module addresses the student's own math skills in geometry, algebra, probability and statistics, regression and change. This knowledge deepens and is used in combination with didactic perspectives relevant to year 4-6. The mathematical content discussed in relation to the abilities that form the basis of the primary school curriculum in mathematics. These abilities are linked to mathematics content and the it is highlighted by focusing on different approaches to support conceptual development and to highlight different problem-solving strategies with particular focus on the role of language and the variety of forms of representation also addressed factors influencing mathematics teaching in school and giving the desire and opportunity to learn mathematics. Mathematics subject characteristics and historical development are highlighted in a comprehensive, school-oriented perspective with a focus on mathematical constructs and ideas. Mathematics education as a research field is illustrated by studies of research articles relevant to primary school mathematics.

Professional base and professional progression

The course prepares the student for upcoming workplace training period and the objectives are formulated for this. During each module the students are trained in a didactic approach based on course content and policy documents based on what, how and why. Questions about the teacher's role, learning situations, material selection and adaptation of work is actualized and further processed in conjunction with the field studies.

Scientific approach and scientific progression

During the course the students get a basic knowledge of the subject and the subject didactics scientific traditions and theoretical concepts. Furthermore, students should be able to find research results with relevance to the area and for the profession. The student will, under supervision, collect, process and make easier the analysis of empirical data and from this produce a simple report with a scientific disposition.

Type of Instruction

The course is conducted through lectures, seminars, methodology sessions and practical sessions. Field study days may be included. Teaching always requires mandatory attendance.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

The course is assessed partial through active participation in seminars, method meeting and presentations, partial through written and oral presentations of individual and group assignments, and partial through written examination/home exam. Some of

examinations are practical elements (field studies) that the student implements and presents. Teaching arrangements requires mandatory attendance.

To receive a passing grade (G) the objectives has to be achieved. To receive Pass with Distinction (VG) on the course the student has to get the grade Pass with Distinction (VG) on both modules. Students who do not pass the regular examination will be offered a second examination within six weeks during the regular semester periods. On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

Course Evaluation

After completing the course, is a course evaluation compiled and written feedback to the students. The statement recognized for the current institutional bodies and for the relevant Programme Board, and filed by the course coordinator department.

Other

The course is included in the primary teacher program.

Required Reading and Additional Study Material

Required Reading

Literature which is used in both modules

Ahlberg , Ann & Wallby, Karin. *Matematik från början* (latest edition). Göteborg: Nationellt centrum för matematikutbildning, Univ.

Anderberg, Bengt & Källgården, Eva-Stina . *Matematik i skolan: didaktik, metodik och praktik* (latest edition). Stockholm: Bengt Anderberg läromedel

Löwing, Madeleine & Kilborn, Wiggo. *Huvudräkning: en inkörsport till matematiken* (latest edition). Lund: Studentlitteratur

Malmer, Gudrun. *Bra matematik för alla: nödvändig för elever med inlärningssvårigheter* (latest edition). Lund: Studentlitteratur

Myndigheten för Skolutveckling. *Mer än matematik- om språkliga dimensioner i matematikuppgifter*. (46 p). www.skolverket.se/publikationer?id=1891

Sollervall, Håkan. *Tal: och de fyra räknesätten* (latest edition). Lund: Studentlitteratur

Skolverket. *Läroplan för grundskolan, förskoleklassen och fritidshemmet 2011*
www.skolverket.se/publikationer?id=2575

Module 1

Skolverket. Rapport 2009:5: *Undervisningen i matematik- utbildningens kvalitet och ändamålsenlighet* (28 p)

www.skolinspektionen.se/Documents/Kvalitetsgranskning/Matte/granskningsrapport-matematik.pdf

Sterner, Görel & Lundberg, Ingvar. *Läs- och skrivsvårigheter och lärande i matematik* (latest edition). Göteborg: Nationellt centrum för matematikutbildning, Göteborgs univ. Tillgänglig på Internet: ncm.gu.se/node/468

Module 2

Hagland, Kerstin, Hedrén, Rolf & Taflin, Eva. *Rika matematiska problem: inspiration till variation* (latest edition). Stockholm: Liber

Löwing, Madeleine . *Grundläggande geometri: matematikdidaktik för lärare* (latest edition). Lund: Studentlitteratur

Compendium and scientific articles, app 100 p.