Linnæus University

Course syllabus

Faculty Board of Science and Engineering

School of Computer Science, Physics and Mathematics

2MD321 Learning study – en modell för utveckling av matematik undervisningen och elevernas lärande - åk 1-9, 15 högskolepoäng

2MD321 Learning study –a model for development of teaching in mathematics and students learning -years 1-9 of compulsory school, 15 credits

Main field of study
Mathematics

Subject Group
Educational Sciences/Theoretical Subjects

Level of classification
First Level

Progression
G2F

Date of Ratification
Approved by School of Computer Science, Physics and Mathematics 2011-05-27
The course syllabus is valid from spring semester 2012

Prerequisites
Teaching degree or equivalent.

Objectives

After completing the course the student should be able to:

- demonstrate subject knowledge as expected learning outcomes for module 1-9 Mathematics in compulsory school years 1-9
- present a didactic skill as expected learning outcomes for module 2- Teaching and learning mathematics with a focus on compulsory schools years 1-9.

Expected learning outcomes for each module:

Module 1 - Mathematics in compulsory school years 1-9, 7.5 credits
After completing the course the student should be able to:

- show- in depth subject knowledge concerning mathematics in elementary school years 1-9 and related stages

- demonstrate the ability to independently analyze the mathematics content and methods
- choose appropriate methods to perform calculations
- demonstrate the ability to put mathematics and mathematics teaching in a historical perspective and thereby illuminate mathematics as an important and evolving part of our culture
- describe the subject of mathematics not only as a stereotypical way of thinking with the rules, but that imagination and creativity are key ingredients to ensure the field structure, development and problem solving methods.

Module 2 - To analyse learning in classrooms, 7,5 hp
After completing the course the student should be able to:

- know the underlying ideas and principles of variation theory to develop students' learning
- have knowledge of the main features of variation theory, and how these can be used as guiding principles for designing and analyzing teaching
- in their own activities to implement and document the teaching of mathematics and student learning
- apply the theory of variation in the planning, implementation and analysis of their own teaching
- to demonstrate how the principles of discernment, variation and critical aspects can serve as guiding principles to design and analyze teaching.

Content
See each module for more information.

Module 1 Mathematics in compulsory school years 1-9 7.5 credits
Arithmetic: real numbers, the four operations of arithmetic, proportion’s theory, and number theory.
Geometry: basic geometric concepts with a focus on problem solving.
Algebra and functions: patterns, prealgebra, the transition from counting with number to counting with symbols, the algebraic cycle, equations, functions.
Statistics and probability: basic statistical concepts, data collection, processing and interpretation of data, probability.

Module 2 Analyse learning in classrooms 7.5 credits
The course will address the variation theory of the development work directly in the classroom, its traits, and how teaching and student learning can be implemented and documented. Experience with the use of variation theory in Sweden and internationally is reported. It also looks at some of the principles of the underlying theoretical basis (variation theory). Key concepts here are: discernment, variation and critical aspects.

Type of Instruction
The teaching is carried out in the form of lectures, seminars, group discussions, individual and/or group assignment and field studies. Course work requires participation and commitment. The students will document and present their own reading and learning orally and in writing. The student must also demonstrate that they master to summarize, see connections and contexts and from a scientific approach reflect on the course content.
Compulsory attendance is required or occurs during all or part of the course and this is apparent from the respective schedules or study guide.

When the course is followed at a distance Internet access is required.

Examination

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

Assessment varies according to course content. Oral and written presentations, individually and in groups as well as seminar occur. Grades are given for each sub course. The ratings are compiled and a final will be graded on the whole course 1-15 credits. At least 9.0 credits with Pass with Distinction gives total grade Pass with Distinction. Assessment Criteria for Pass is clear from the expected learning outcomes (see above).

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

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Required Reading and Additional Study Material

Required Reading

Löwing, M. & Kilborn, W. 2003. Huvudräkning en inkörsport till matematiken. Studentlitteratur, Lund. ISBN 91-44-04225-6.

Nämnaren Tema 5 (1992). Uppslagsboken. NCM, Göteborgs universitet. ISBN 91-88450-34-1

Additionally,

Current curricula in mathematics from the National Agency.

Current document from the National Agency regarding objectives, analysis of pupils' knowledge and diagnosis of Mathematics.

List of references Module 1 - Mathematics in compulsory school years 1-9 7.5 credits

Required Reading

Bergsten, C., Häggström, J. & Lindberg, L. 1997. *Algebra för alla*. Nämnaren Tema, NCM. ISBN 91-88450-08-2 .

Dahl, K. & Nordqvist, S. 1994. *Matte med mening*. Alfabeta Bokförlag. ISBN: 91 771 2410 3.

Emanuelsson, G., Johansson, B. & Ryding, R. (red.), 1992. *Geometri och statistik*. Studentlitteratur och Utbildningsradion. ISBN: 91-44-35401-0.

Sollervall, H. 2007. *Tal och de fyra räknesätten*. Studentlitteratur, Lund. ISBN 978-91-44-04527-6.

In addition, the use of scientific articles and training materials.

List of references Module 2 - Analyse learning in classrooms 7.5 credits

Required Reading

Holmqvist, M. (2006). *Lärande i skolan. Learning study som skolutvecklingsmodell*.

Lund: Studentlitteratur. 224 p.

Lo, M.L., Pong, W. Y.,& Chik, P. (2005). *For each and everyone. Catering for individual differences through Learning studies*. Hong Kong: hong Kong University Press. 149 p.

Marton, F., & Tsui, A. B. M. (Eds.). (2004). *Classroom discourse and the space of learning*. Mahwah: N.J.: Lawrence Erlbaum. kap 1. 40 p.

Marton, Ference., & Booth, Shirley. (2000). *Om lärande*. Lund: Studentlitteratur. ca 280 p.

In consultation with the instructor for the elective didactics' subject will be selected literature, reports and scholarly articles, about 100-200 pages.