Linnæus University

Course syllabus

Faculty of Technology
Department of Mathematics

4MD101 Introduktion i matematikdidaktisk forskning, 7,5 högskolepoäng
Introduction to Research in Mathematics Education, 7.5 credits

Main field of study
Mathematics Education

Subject Group
Educational Sciences/Theoretical Subjects

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved 2013-12-16
Revised 2018-04-23 by Faculty of Technology. Removal of ECTS-grading scale and course evaluation is changed.
The course syllabus is valid from autumn semester 2018

Prerequisites
Basic eligibility for second level studies and English course B/English 6, teachers certificate with specialization mathematics or equivalent.

Objectives

After completing the course, the student should both in speech and writing be able to:

- summarize research in educational sciences, especially mathematics education
- explain how the area of mathematics education as a reaserch filed has emerged
- relate to and discuss arguments for research and development in mathematics education
- discuss mathematics as reaserch and school subject
- identify and ask issues in mathematics education that can be empirical or theoretical investigated
- describe the possibilities and limitations, its role in society and the responsibility for its use
- evaluate the importance of research as a basis for position in mathematics education issues

Content

The course content is divided into five parts:

- orientation in mathematics education research field and how the field of knowledge has emerged
- research/development in mathematics education, question formulation, methods and results, and how these relate and lead to relevant and appropriate conclusions
- scientific excellence applied to the mathematics education research field
- analysis of others' empirical studies

Type of Instruction

The teaching consists of lectures, classroom observations, seminars and presentations. The teaching is based to a significant extent on the students' active participation, individually and in groups, which requires mandatory attendance at seminars and presentations.

The course is offered as a distance learning.

Examination

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

The examinations consist of written and oral presentations of the reading material and completed assignments and active participation in group discussions.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed.

Required Reading and Additional Study Material

Required literature

Anghileri, J. (2014). Arithmetic. In P. Andrews, & T. Rowland (Eds.), Master class in mathematics education. International perspectives on teaching and learning (s. 137-150). London: Bloomsbury.

Bass, H. (2008). Moments in the life of ICMI. In M. Menghini, F. Furinghetti, L. Giarcardi, & F. Arzarello (Eds.), The first century of the international commission on mathematics instruction (1908-2008). Reflecting and shaping the world of mathematics education (s. 9-24). Rome, Italy: Instituo della Encyclopedia Italiana. (http://www.unige.ch/math/EnsMath/Rome2008/AnnProc10.pdf); s. 9-12

Carpenter, T. P., & Fennema, E. (1996). Cognitively guided instruction: A knowledge base for reform in primary mathematics instruction. The Elementary School Journal, 97 (1), 3-20.

Davis, P. J., & Hersh, R. (1981). The mathematical experience. Boston: Birkhäuser. (s. 291-296)

Ernest, P. (2014). What is mathematics and why learn it? In P. Andrews & T. Rowland (Eds.), Master class in mathematics education. International perspectives on teaching and learning (s. 3-14). London: Bloomsbury.

Kilpatrick, J. (2008). The development of mathematics education as an academic field. In M. Menghini, F. Furinghetti, L. Giacardi, & F. Arzarello (Eds.), The first century of the International Commision on Mathematical Instruction (1908-2008). Reflecting and shaping the world of mathematics education (s. 25-39). Rome: Instituo Enciclopedia Italiana. Fondata da Giovanni Treccani.
(http://www.unige.ch/math/EnsMath/Rome2008/AnnProc10.pdf);

Lakatos, I. (1976). Proofs and refutations. The logic of mathematical discovery. Cambridge: Cambridge University Press.

Lampert, M. (1990). When the problem is not the question and the solution is not the answer: mathematical knowing and teaching. American Educational Research Journal 27(1), 29-63.

McClain, K., & Cobb, P. (2001). Supporting students' abilitiy to reason about data. Educational Studies in Mathematics, 45(1-3), 103-129.

National Council of Teachers of Mathematics. (2000). The principles and standards for school mathematics. Reston, VA: NCTM.

Niss, M. (2007). Reflections on the state of and trends in research on matheamtics teaching and learning. From here to Utopia. In F. K. Lester (Ed.), Second handbook of research on mathematics teaching and learning (Vol. 2, s. 1293-1312). Charlotte, NC: NCTM & IAP.

Schoenfeld, A. (2000). Purposes and methods of research in mathematics education. Notices of the AMS, 47(6), 641-649.

Sfard, A. (2005). What could be more practical than good research? On mutual relations between research and practice of mathematics education. Educational Studies in Mathematics, 58(3), 393-413.

Skolverket (2011): Läroplan för grundskolan, förskoleklassen och fritidshemmet 2011. Stockholm: Skolverket.

Skott, J., Jess, K. & Hansen, H. C. (med Lundin, S.)(2010). Matematik för lärare. d. Didaktik. Malmö: Gleerups

Stylianides, A. J. (2007). Proof and proving in school mathematics. Journal for Research in Mathematics Education, 38(3), 289-321.

Stylianides, A.J. (2014). Proof. In P. Andrews, & T. Rowland (Eds.), Master class in mathematics education. International perspectives on teaching and learning (s. 101-112). London: Bloomsbury.

Reference literature