



Course syllabus

Faculty of Technology

Department of Mathematics

4MD105 Internationella perspektiv på läroplaner och undervisning i matematik, 7,5 högskolepoäng

4MD105 International perspective on curriculum and instruction in mathematics, 7.5 credits

Main field of study

Mathematics Education

Subject Group

Educational Sciences/General Didactics

Level of classification

Second Level

Progression

A1N

Date of Ratification

Approved 2014-12-09

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

Degree of at least 180 credits, whereof 60 credits concern courses in mathematics or mathematics education and at least 7,5 credits in mathematics education research.

Objectives

Having completed the course the students should be able to:

- identify different factors and forces that influence the mathematics curriculum change and education in mathematics
- identify and describe important mathematical concepts, methods, and competency that are central to school mathematics and understand how those ideas are developed in standards in different countries
- analyze mathematics textbooks in terms of content and pedagogical goals and characterize mathematics textbooks in different countries
- reflect on different countries' educational materials and use of new technologies
- understand cultural variation in mathematics teaching practice in different countries and identify factors influencing teachers' teaching

- understand student performance on different levels assessment in different educational systems.

Content

The course aims to provide an understanding of mathematics education from an international perspective.

The course covers the following items:

- The historical development of mathematics curriculum and education in mathematics (key events of mathematics curriculum reform in different historical periods)
- The intended mathematics curriculum in different countries (national or state mathematics standards)
- The mathematics textbook curriculum in different countries (curriculum materials provided to teachers and students by schools)
- The implemented mathematics curriculum in different countries (mathematics teaching)
- The learned mathematics curriculum in different countries (mathematics assessment, Which mathematics has the students learned?).

Type of Instruction

Seminar, self-tuition and exchange of experiences. Discussions and seminars can occur on a web-based learning platform.

Examination

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

Assessment of student performance is made through written test and/or oral examinations and/or presentation of mandatory assignments. The assessment method is decided at the start of the course.

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 Reading

Andrews, P. & Rowland, T. (Eds.) (2014). *MasterClass in mathematics education: international perspectives on teaching and learning*. London: Bloomsbury Publishing (Chapter 5, 15, 16, 17).

Charalambous, C. Y., Delaney S., Hsu H., & Mesa, V. (2010). A Comparative analysis of the addition and subtraction of fractions in textbooks from three countries. *Mathematical Thinking and Learning*, 12, 117–151.

Clements, M.A., Bishop, A., & Keitel, C., et al. (2013). *Third International Handbook on Mathematics Education*. New York, Springer (Chapter 29, 30).

Givvin K. B., Hiebert J., Jacobs J. K., Hollingsworth H., & Gallimore, R. (2005). Are there national patterns of teaching? Evidence from the TIMSS 1999 Video Study. *Comparative Education Review*, 49 (3), 311-342.

Grønmo, Liv Sissel (2013). What Characterizes Mathematics Education in the Nordic Countries?. In *Nordic research in didactics of mathematics: Past, present and future*. Cappelen Damm Akademisk. Chapter 27.

Hemmi, K., Lepik, M., & Viholainen, A. (2013). Analysing proof-related competences in Estonian, Finnish and Swedish mathematics curricula—towards a framework of developmental proof. *Journal of Curriculum Studies*, 45 (3), 354–378.

Mesa, V. (2004). Characterizing practices associated with functions in middle school textbooks: An empirical approach. *Educational Studies in Mathematics*, 56, 255 - 286.

Pepin, B., Gueudet, G., & Trouche, L. (2013). Investigating textbooks as crucial interfaces between culture, policy and teacher curricular practice: Two contrasted case studies in France and Norway. *ZDM Mathematics Education*, 45, 685 -698.

Skott, Jeppe., Jess, Kristine., Hansen, Hans. Christian., & Lundin, Sverker. (2010). *Matematik för lärare, Delta Didaktik (J. Retzlaff, övers.)*. Malmö: Gleerups. (Original publicerat 2008). Chapter 12.

Stanic, G., & Kilpatrick, J. (1992). Mathematics curriculum reform in the United States: A historical perspective. *International Journal of Educational Research*, 17, 407-417.

Stigler, J., & Hielbert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom*. New York: Free Press.

Reference Literature

Askew, M., Hodgen, J., Hossein, S., & Bretscher, N. (2010). *Values and Variables: Mathematics Education in High-performing Countries*. London: The Nuffield Foundation.

Cai, J., & Nie, B. (2007). Problem solving in Chinese mathematics education: Research and practice. *ZDM Mathematics Education*, 39, 459–475.

Cogan, L., & Schmidt, W. H. (2002). "Culture shock" -- Eighth-grade mathematics from an international perspective. *Educational Research and Evaluation*, 8, 13-39.

Clements, M.A., Bishop, A., & Keitel, C., et al. (2013). *Third International Handbook on Mathematics Education*. New York, Springer (Chapter 25, 26, 27, 28, 31).

Grevholm, B. (2011). Network for research on mathematics textbooks in the Nordic countries. *Nordic Studies in Mathematics Education*, 16 (4), 91–102.

Haggarty, L., & Pepin, B. (2002). An investigation of mathematics textbooks and their use in English, French, and German classrooms: Who gets an opportunity to learn what? *British Educational Research Journal*, 28(4), 576-590.

Remillard, J. T. (2005). Examining key concepts in research on teachers' use of mathematics curricula. *Review of Educational Research*, 75, 211-246.

Siraman, B. et al. (Eds) (2013). *The first sourcebook on Asian research in*

mathematics education: China, Korea, Singapore, Japan, Malaysia and India. Information Age Publishing.

Siraman, B. et al. (Eds) (2010). The first sourcebook on Asian research in mathematics education: Norway, Sweden, Iceland, Denmark and contributions from Finland. Information Age Publishing.

Stanic, G. & Kilpatrick, J. (Eds.) (2003). A History of School Mathematics. Reston, VA: National Council of Teachers of Mathematics (Chapter 11, 12, 13, 14, 15).

Sun, X. (2010). "Variation problems" and their roles in the topic of fraction division in Chinese mathematics textbook examples. Educational Studies in Mathematics, 76 (1), 65-85.

Övrig litteratur med fokus på matematikkompetens, läroplan, läromedel eller undervisning i matematik ur ett internationellt perspektiv väljs i samråd med kursansvarig lärare.