New courses in mathematics education for doctoral students

Graduate course for doctoral students in didactics of mathematics at Copenhagen University

Through the support from the Nordic Graduate school in Mathematics Education it is possible to create and offer new courses in mathematics education for doctoral students in the Nordic and Baltic countries. The first new course of this kind is now being given in Denmark.

Theory and practice of four French frameworks for research in the didactics of mathematics is the title of the course and it is organised by the Centre for Science Education, University of Copenhagen and the Nordic Graduate School in Mathematics Education.

This course aims to introduce participants to four related theoretical frameworks for research in the didactics of mathematics, to foster reflection and discussion among participants on the nature of the discipline in the light of these theories, and to enrich the participants' own work by relating it to one or more of these frameworks. The four frameworks are:

- The theory of conceptual fields (due mainly to Gérard Vergnaud)
- The semiotic approach (due mainly to Raymond Duval)
- The theory of didactical situations in mathematics (due mainly to Guy Brousseau)
- The anthropological approach (due mainly to Yves Chevallard)

The course literature will contain both basic theory and related, more specialised research articles. All of the required readings will be in English, but some additional (and optional) texts may be in French and the course language will be English. The course started in November 2004 and will be finished in March 2005.

The course will require about 200 hours of work, corresponding to a course credit of 7.5 ECTS points. The work includes readings, oral presentations and final essay. Course assessment will be based on the final essay. Carl Winsløw is responsible for this course.

Courses included in the doctoral programme at Agder University College, Norway

For the first time the course **Problem Solving** will be given in Agder with Hans Erik Borgersen as course responsible and with the assistance of John Mason, Roger Säljö and Raymond Bjuland.

The course will discuss problem solving in mathematics, both used individually and collaboratively in small groups, with focus on:

- the problem-solving process, involving cognitive, meta-cognitive, socio-cultural and affective processes,
- collaborative problem solving in small groups
- problem solving as a tool for learning and teaching at different levels in school,
- the development of problem solving research
- methods for research in collaborative problem solving in small groups/class,
- research literature

The aim and objective of this course is to develop a deeper understanding of problem solving and collaborative small-group work in mathematics such that it can be used professionally in teaching mathematics and in mathematics education research.

The course will give 10 ECTS-credits and will be given in English. The students will be offered lectures and seminars with a start in week 6 in 2005 and end in week 16.

The assessment will be oral exam, a research project or an essay.

The course **Research design and research methods in Mathematics Education** has been given twice before and will start again in Spring 2005. As the course above it can be taken as a distance course as the lessons are in weeks 3, 6, 10, and 16. In charge of this course is Simon Goodchild. The course will give 10 ECTS-credits.

The course will discuss science as method, the scientific explanation and pluralist methodologies. It will consider new analytical and thematic perspectives, like culturalist approaches, the social constructionism and new contextualisms. The course will further discuss qualitative research from the perspectives: The history of the field, ethnography and the discovery of the other, social responsibilities, and ethics and politics. The topic of collecting and analyzing empirical materials will be discussed,

as well as observational methods, interviews, analysing talk and text, and mathematical task analysis. Also a discussion of research in mathematical education using quantitative methods will be part of the course content.

The aim and objective of this course is, in the first place, to approach scientific methods from an analytical and critical perspective. Secondly, focus on the main issues and discussions related to problems and research methods in mathematics education of today.

The Assessment is in the form of an oral exam and research project or essay.

Financial support for doctoral students

The three courses mentioned here are open to students from the Nordic and Baltic countries and such students can apply for financial support for the travels to the course meetings they are expected to attend. Thus the main part of the studies can take place at the home university of the student but there will be, hopefully inspiring, course meetings where all participants come together. More information about the activities in the Nordic Graduate school of Mathematics Education can be found on the web page www.hia.no/realfag

On behalf of the board of the Nordic Graduate school in Mathematics Education

Barbro Grevholm, Director
Faculty of Mathematics and Science
Agder University College
Serviceboks 422
N-4604 Kristiansand
Norway