Linnæus University

Dnr: 2014/2408 -3.1.2

Course syllabus

Faculty of Technology

Department of Mathematics

5MA11E Examensarbete på masternivå, 30 högskolepoäng
5MA11E Master's Thesis, 30 credits

Main field of study
Mathematics

Subject Group
Mathematics

Level of classification
Second Level

Progression
A2E

Date of Ratification
Approved 2009-08-11
Revised 2014-09-03 by Faculty of Technology. Prerequisites, objectives, content, examination and type of instructions are revised.
The course syllabus is valid from autumn semester 2015

Prerequisites
4MA151, 4MA101, 4MA201, 4MA115, 4MA125 and 4MA121 or 4MA221. In addition, required courses 4MA123 and 4MA124 or courses 4MA112 and 4MA103 or 4MA203, 4MA205, 4MA202 and 4MA207

Objectives

After completing the course, the student should be able to:

1. demonstrate knowledge and understanding, and insight into current research in the field of the thesis
2. critically, independently and creatively identify and formulate issues and to plan and adequate methods carry out advanced tasks including evaluation of the work within the specified time limits
3. verbally present and discuss their own and others results in dialogue with different groups
4. present in writing and discuss their own and others' results in accordance with accepted scientific practices in mathematics
5. ability to identify their need of further knowledge and to take responsibility for its development

6. insert the obtained results in a larger mathematical or applied context

- work independently with methods and theory development in an area of mathematics and be able to explain mathematical theory building and various mathematical proof techniques

or

- independently apply mathematical theories and mathematical methods
- show good ability to describe realistic problems with mathematical models and analyze these models analytically and numerically
- use and analyze mathematical and numerical software suitable for mathematical applications.

Content

Each student is appointed a supervisor and examiner. The student in consultation with the supervisor and examiner formulates a project, in a recent mathematical subject. The student will carry out this project. This usually means that the student is studying scientific texts, applying mathematical methods and obtain their own results. The work is presented in a written report tailored to accepted scientific practice in mathematics and presented and discussed at a seminar.

Type of Instruction

Lectures, seminars and tutoring

Examination

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

The grades on the thesis are set by appointed examiners after consultation with the supervisor. The examiner and the supervisor should not be the same person. On request, students may have their credits translated to ECTS-marks A, B, C, D, E, FX, F.

Assessment Criteria
Five general criteria are the base for the examiners assessment:

A. Knowledge and understanding
B. Planning and Implementation
C. Results, analysis and interpretation
D. Oral presentation and communication
E. Written presentation.

In the assessment process, the student's ability to use their own initiative independently move the project forward and to keep the set time frames are considered.

The examiner gives the grade to be awarded according to the scale:
0 - Nonexistent
1 - Unsatisfactory
2 - Sufficient
3 - Good
4 - Excellent.

The final grade is a combination of the five criteria. For a passing grade the objectives has to be achieved. For grade E according to the ECTS scale the student must receive at least grade Satisfactory (2) in all the assessment criteria.

Explanation of assessment criteria
The complete objectives that has to be achieved are presented above under Objectives.

A. Knowledge and understanding (Objectives 1 and 7)
The student will demonstrate a deeper understanding of the selected task and its scientific context and purpose. The student should be able to work independently with methods and theory development in an area of mathematics and be able to explain mathematical theory building and various mathematical proof techniques or independently apply mathematical theories and mathematical methods with mathematical modeling and numerical simulation.

B. Planning and Implementation (Objective 2)
The student will demonstrate the ability to plan and use appropriate methods to implement the selected task and be able to demonstrate the ability to critically, independently and creatively identify and formulate sub problems. Independence, initiative, creativity and the ability to keep time frames should be considered in the assessment. For criterion also includes the student's ability to evaluate their work in the paper and in discussion with the supervisor and examiner. The student's logbook can be a support for the assessment.

C. Results, analysis and interpretation (Objectives 5 and 6)
The student should be able to process and analyze the results obtained with mathematical or numerical methods. The student should be using the available literature to put the results into a larger mathematical or applied context. Independence, initiative and creativity should be considered in the assessment as well as the ability to identify their need of further knowledge.

D. Oral presentation and communication (Objectives 3)
The student will demonstrate the ability to adapt the oral presentation to the target group, to make it interesting and clearly structured. The content must be correct and both the text and image to be interpretative for all audiences. The time frame should be held. The student will demonstrate the ability to maintain contact with the audience and be able to answer questions clearly and discuss the results. For this criterion also includes the student's ability to orally communicate and discuss their findings during the work and to adapt to a scientific mode of expression and the ability to communicate with different audiences. This includes opposition on other students' work.

E. Written presentation (Objectives 4)
The purpose of the work and its scientific context, as well as the findings and conclusions, should be clearly stated in a coherent written report that will be suited to the accepted scientific practice in mathematics. The presentation should be linguistically correct, clear and logical and easy to read and interesting. There must also be a popular scientific description of the work in Swedish, if students have mastered the language, or English about half an letter size page.

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

The student selects suitable literature for the specific field of study in consultation with

the supervisor and the examiner.