



LUND
UNIVERSITY

Faculty of Science

NUMM03, Numerical Analysis: Master's Thesis, 30 credits

*Numerisk analys: Examensarbete for masterexamen, 30
högskolepoäng*

Second Cycle / Avancerad nivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2019-12-12 to be valid from 2019-12-12, autumn semester 2020.

General Information

The course is a compulsory course for second-cycle studies for a Degree of Master of Science (120 credits) in mathematics with specialisation numerical analysis.

Language of instruction: English

Main field of studies

Mathematics with specialization in
Numerical Analysis

*Depth of study relative to the degree
requirements*

A2E, Second cycle, contains degree
project for Master of Arts/Master of
Science (120 credits)

Learning outcomes

The aim of the degree project is that the student through an independent project should show knowledge understanding, competence, skills, ability, judgement and approach in accordance with the requirements for obtaining a Degree of Master of Science in mathematics with specialisation in numerical analysis. The degree project shall be specialised and show that the student can apply numerical methodology.

Knowledge and understanding

After completing the course the student should be able to:

- in detail describe and use methods within a specialisation of some sub-field of numerical analysis and be able to discuss the possibilities and limitations of these methods,

- describe research questions in a sub-field of numerical analysis.

Competence and skills

After completing the course the student should be able to:

- be able to critically and independently analyse, manage and formulate questions that are relevant to research or development work in a sub-field of numerical analysis,
- plan and execute a scientific project work within given time frames using appropriate mathematical and numerical methods,
- give a clear and thorough written report on the results of the completed project work and the knowledge and arguments on which they are based,
- at an oral presentation summarize the most important results of the project work as well as briefly discuss the knowledge and arguments that underlie them,
- summarize the most important results of the completed project work in a written popular scientific report.

Judgement and approach

After completing the course the student should be able to:

- discuss relevant scientific, social and ethical aspects related to the completed project work,
- take responsibility for their knowledge development, thereby identifying their own need for further knowledge and planning to acquire the needed knowledge.

Course content

The content and execution of the degree project are planned in consultation with a supervisor. The degree project consists of an independent smaller research or development assignment that can either relate to current projects at the department or to problems within the subject area at companies or other institutions within or outside the university. If the work is carried out outside the department, there should also be a supervisor at the department.

Course design

The thesis requires a literature review and special studies. In addition, there are a number of compulsory activities in the form of lessons, seminars and other exercises, which treat scientific, academic, and popular science communication, including both written and oral presentation, discussion and feedback.

The project work should correspond to twenty weeks of full-time studies. During the project, guidance is given by a qualified supervisor. If the work is carried out under supervision outside the department, another supervisor is appointed at the department.

At the start of the course, the student, in consultation with the supervisor, should establish a study plan containing a description of the assignment, a problem analysis and a project timeline.

The work is presented in the form of a project report in English with a popular scientific description in Swedish or English. The work is also presented orally at a public seminar for discussion, criticism and analysis. Prior to the presentation, the student, together with his / her supervisor, must review their work based on the

learning objectives in this syllabus and / or in the goals of the Higher Education Act for the master's degree.

Assessment

Examination consists of a written scientific report, a brief written popular scientific summary and through an oral presentation of the project work at a seminar. In addition, an approved written timetable established at the beginning of the work is required, participation in all compulsory activities and a brief reflection on the student's own learning.

The written report must be submitted to the examiner in a version that permits examination at least two weeks before the seminar. The department is responsible for the multiplication of the report according to the requirements of the university and the faculty. Upon final approval, the student is responsible for archiving the report in a system supplied by the university.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.

To obtain the grade Pass, the following examination parts are required:

- a timetable established at the beginning of the work,
- participation in all compulsory elements,
- a scientific written report on the work,
- an oral presentation of the work before a grading committee consisting of examiner and supervisor,
- a written popular scientific description of the work,
- a brief reflection on the student's own learning.

The final grade is determined by weighing the results on the parts included in the examination. The examiner decides the grade in consultation with the supervisor. If the examiner assesses that the degree project can not be approved, the student shall be given the possibility to supplement the work for a renewed assessment within approximately half a semester. If the work does not meet the learning outcomes of the course after this renewed assessment, the examiner may decide to fail it.

Entry requirements

Admission to the course requires a Bachelor's degree in mathematics or equivalent and English B / 6. Furthermore, second-cycle courses in the mathematical disciplines comprising 45 credits, of which at least 22.5 credits in numerical analysis including the course NUMN20 Numerical methods for differential equations, 7.5 credits, or equivalent, are required.

Further information

The course may not be included in a higher education qualification together with NUMM01 Numerical analysis: Degree Project, 30 credits.

Subcourses in NUMM03, Numerical Analysis: Master's Thesis

Applies from H20

2001 Numerical Analysis: Master's Thesis, 30,0 hp
Grading scale: Fail, Pass, Pass with distinction