



LUND
UNIVERSITY

Faculty of Science

NUMK11, Numerical Analysis: B.A. Degree Project, 15 credits

Numerisk analys: Examensarbete för kandidatexamen, 15 högskolepoäng
First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2018-10-01 to be valid from 2018-10-01, spring semester 2019.

General Information

The course is an alternatively compulsory course for first-cycle studies for a Bachelor of Science in Mathematics.

Language of instruction: Swedish and English

The student may choose to write the degree report in Swedish.

Main field of studies

Mathematics

Depth of study relative to the degree requirements

G2E, First cycle, has at least 60 credits in first-cycle course/s as entry requirements, contains degree project for BA/BSc

Learning outcomes

The aim of the degree project is that the student through an individual assignment should show knowledge understanding, skills, ability, judgement and approach in accordance with the requirements that are set to receive a Bachelor of Science in mathematics. The student should be able to:

Knowledge and understanding

1. describe, use and discuss mathematics that is included in the undergraduate education,

2. use and apply the methods of mathematics,
3. describe research issues in a subarea of numerical analysis at a general level,
4. describe and account for a specialisation within some subarea of numerical analysis,

Competence and skills

5. critically search, evaluate and interpret relevant information for a mathematical problem,
6. discuss problems within mathematics,
7. independently formulate, delimit and solve problems within mathematics,
8. carry out assignments within given time frames,
9. present orally and discuss information, problem and solutions within mathematics in dialogue with different groups,
10. present in writing and discuss information, problem and solutions within mathematics in dialogue with different groups,
11. work independently within the field of mathematics,

Judgement and approach

12. identify, discuss and make assessments regarding relevant scientific, social and ethical aspects of mathematics,
13. identify and discuss mathematics' role in society and people's responsibility for how it is used,
14. identify, discuss and plan ones own need of additional knowledge,
15. develop ones skills within the field of mathematics or other fields.

Course content

The student chooses, in consultation with supervisors and examiner, an independent examination assignment comprising 15 credits. The assignment can either be linked to current scientific projects in numerical analysis at the Department of Mathematics or to problems within the subject area at companies or other departments within or outside the university. If the work is carried out outside the department, an internal supervisor should also be assigned.

Course design

The Degree Project requires a literature survey and specialised studies. The project can include implementation of numerical methods in a computer program as well as numerical experiments. Furthermore, a number of compulsory activities can be included, in the form of teaching sessions and seminars that treat e.g. scientific writing in English and Swedish, popular writing, academic honesty and the use of library resources. The work should correspond to ten weeks of full-time studies. During the span of the project, usually one semester, the department should appoint a

supervisor. If the work is carried out under supervision outside the department, the department should appoint an extra supervisor.

At the beginning of the course, the student and the supervisor should make a written work plan containing a description of the assignment and a timeline. The work plan should be submitted to the course coordinator as documentation for registration.

A progress report can be prepared, after for example half the planned working hours.

The work is presented in the form of a project report in English or Swedish, with a popular scientific description in Swedish or English. The work is also presented orally in English or Swedish, at a public seminar for discussion, criticism and analysis. Before the presentation the student should together with the supervisors review the work based on the expected learning outcomes in this course syllabus and/or in the Higher Education Act for Bachelor's degree.

Assessment

The examination and the compulsory parts that are required to pass are (in brackets is stated which learning goals that the different parts examines):

- a passed plan that is established early (aim 1 and 7)
- participation in all compulsory parts (prepare for aim 9 and 10)
- a scientific, written report (aim 1-8, 10-15)
- an oral presentation of the work before an examining committee consisting of examiner and supervisor (aim 1-9, 11-15)
- a popular description of the work (aim 10, 12-13)
- a brief description of the implementation and self-reflection over the student's own learning (aim 10 and 14)

The written report should be handed in to the examiner in a version that is possible to review at least two weeks before the seminar. Before this the report should be accepted by the supervisor. The department is responsible for the publication of the report according to the requirements of the university and the faculty. The student is responsible for uploading the report to the universities system for archiving.

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.

The final grade is determined by combining the results of the different parts of the examination. The examiner decides the grade in consultation with the supervisor. If the examiner assesses that the work can not be accepted the student should be given the possibility to complete the work for a renewed assessment within approximately half a semester. If the work does not satisfy the expected learning outcomes after this renewed assessment, the examiner can determine that the student has failed. This can imply that work must be entirely redone, to satisfy all the learning outcomes.

Entry requirements

For admission to the course, general entry requirements and knowledge equivalent to 90 higher education credits in mathematics are required. These should include 22.5 credits in numerical analysis corresponding to the courses NUMA01 Computational Programming with Python, 7.5 credits, NUMA41 Numerical Analysis, Basic Course, 7.5 credits, and NUMA11 Numerical Linear Algebra, 7.5 credits.

Further information

The course may not be included in a degree together with NUMK01 Mathematics: Bachelor's Degree Project, 15 credits.

Subcourses in NUMK11, Numerical Analysis: B.A. Degree Project

Applies from V19

1801 Bachelor's Degree Project, 15,0 hp
Grading scale: Fail, Pass, Pass with distinction