



**LUND**  
UNIVERSITY

Faculty of Science

## NUMN12, Numerical Analysis: Numerical Methods for Differential Equations, 7.5 credits

*Numerisk analys: Numeriska metoder för differentialekvationer, 7,5  
högskolepoäng*

Second Cycle / Avancerad nivå

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### Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2007-04-12 to be valid from 2007-07-01, autumn semester 2007.

### General Information

The course is an elective course for second-cycle studies for a degree of Master of Science (120 credits) in mathematics.

*Language of instruction:* English and Swedish

*Main field of studies*

Mathematics

*Depth of study relative to the degree requirements*

A1N, Second cycle, has only first-cycle course/s as entry requirements

### Learning outcomes

The aim of the course is that students on completion of the course should have acquired the following knowledge and skills: Knowledge and understanding The student should be able to apply and also adapt modern computational methods for ordinary and partial differential equations to varying problems. The student should also understand the elaboration of the methods. Skills and abilities The student should independently be able to choose, implement and use modern computational algorithms. Further, the student should be able to assess the relevance and precision of the results. Judgement and approach The student should during the course present solutions of problems and numerical results in written form. With adequate terminology, in a logical and well-structured manner, account for the design of modern numerical methods and algorithms. with adequate terminology, in an algorithmic and well-structured manner, account for numerical solutions to a problem which is formulated mathematically.

## Course content

The course consists of one subpart of 7.5 credits. One- and multi-step methods for integration in time. Discretization methods for boundary value problems for ordinary and partial differential equations. Numerical methods for time-dependent partial differential equations.

## Course design

The teaching consists of lectures and compulsory computer exercises.

## Assessment

Examination consists of written laboratory reports during the course and a written exam at the end of the course. For students not passing the regular written exam, two additional exams are offered. The first one shortly after the marking is finished.

*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 pass the entire course, passed at written exam and passed laboratory reports are required. The pass on the laboratory reports remains valid until the start of the next instance of the course. The final grade is based on the joint results of the laboratory reports and the exam.

## Entry requirements

For admission to the course, general entry requirements, English B and knowledge equivalent to the course NUMA12 Numerical Approximation, 7.5 credits, are required.

## Further information

The course may not be included in a higher education qualification together with NUM122 Numerical analysis: Numerics 2, 7.5 credits.

## Subcourses in NUMN12, Numerical Analysis: Numerical Methods for Differential Equations

Applies from H07

0701 Numerical Methods for Differential Equations, 7,5 hp  
Grading scale: Fail, Pass, Pass with distinction