MATC70, Mathematics: Matrix Theory, 7.5 credits  
_Matematik: Matristeori, 7,5 högskolepoäng_  
First Cycle / Grundnivå

Details of approval
The syllabus was approved by Study programmes board, Faculty of Science on 2018-04-26 to be valid from 2018-04-26, autumn semester 2018.

General Information
The course is an optional course for first-cycle studies for a Bachelor of Science or a Master of Science degree in mathematics.

Language of instruction: English

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<tr>
<th>Main field of studies</th>
<th>Depth of study relative to the degree requirements</th>
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<td>Mathematics</td>
<td>G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements</td>
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Learning outcomes
The main aim of the course is to convey knowledge about concepts and methods from matrix theory and linear algebra which are important in applications within many subjects in science, technology and economy, and familiarity with their use.

Knowledge and understanding
On completion of the course, the student should be able to:

- independently characterize and use different types of matrix factorizations.
- independently explain the theory of matrix functions, in particular polynomials, and its connection to the Jordan normal form.
- describe different types of vector and matrix norms, and to compute or estimate them as well with as without computer support.
- describe the common classes of normal matrices and their properties.
Competence and skills
On completion of the course, the student should be able to:

- integrate methods and approaches from the different parts of the course in order to solve problems and answer questions within the framework of the course.
- write computer programs for the solution of mathematical problems within the framework of the course.
- orally and in writing, with clear logic and with proper terminology be able to explain the solution to a mathematical problem within the framework of the course.

Course content

Course design
The teaching consists of lectures and exercise classes. Two smaller programming assignments shall be completed during the course.

Assessment
The examination consists of a written home examination, an appurtenant oral examination and two programming assignments. The oral examination is only given to those students who have passed the written home examination.

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.

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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 achieve the grade Pass, it is required to pass the programming assignments, the written home examination and the oral examination. Whether the grade Pass with distinction should be given is decided by combining the results of the included examination parts.
Entry requirements

To be eligible for the course, at least 67.5 higher education credits in mathematics and numerical analysis are required, including the courses MATB22 Linear Algebra 2, 7.5 credits, NUMA01 Computational Programming with Python, 7.5 credits and one of the courses MATB13 Discrete Mathematics 7.5 credits and MATB24 Linear Analysis 7.5 hp, or equivalent.

Further information

The course is given jointly with the course FMAN70 Matrix theory, 6 credits, at the Faculty of Engineering and can not be included in a degree together with this course.
Subcourses in MATC70, Mathematics: Matrix Theory

Applies from H18

1801  Written take-home examination, 6,0 hp
   Grading scale: Fail, Pass, Pass with distinction
1802  Oral examination, 1,5 hp
   Grading scale: Fail, Pass, Pass with distinction
1803  Computer assignments, 0,0 hp
   Grading scale: Fail, Pass