Faculty of Health, Science and Technology
Mathematics

# Syllabus

## Mathematics for Engineers III

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| **Course Code:** | MAGA47 |
| **Course Title:** | Mathematics for Engineers III<br>*Matematik för ingenjörer III* |
| **Credits:** | 7.5 |
| **Degree Level:** | Undergraduate level |
| **Progressive Specialisation:** | First cycle, has less than 60 credits in first-cycle course/s as entry requirements (G1F) |

**Major Field of Study:**
MAA (Mathematics)

**Course Approval**
The syllabus was approved by the Faculty of Health, Science and Technology 2020-03-11, and is valid from the Autumn semester 2020 at Karlstad University.

**Prerequisites**
Mathematics for Engineers I-II (15 ECTS credits), or the equivalent.

**Learning Outcomes**
The aim of the course is for students to acquire the tools needed in the areas of transform theory and statistics to study basic electrical engineering, control theory, and signal processing.

Upon completion of the course, students should be able to:
- calculate the Fourier series of a periodic function and the Fourier transform of a function,
- solve linear differential equations using the Laplace transform,
- solve linear difference equations using the Z-transform,
- use probability distributions to solve problems,

- calculate point estimations and confidence intervals.

**Content**
Transform theory:
- The Laplace transform and solving differential equations,
- The Z-transform and solving difference equations,
- Fourier series of periodic functions,
- The complex form of the Fourier transform.

Probability and Statistics:
- Basic probability theory, conditional probability, independent events,
- Stochastic variables, a few discrete and a few continuous distributions,
- Expected value, variance, standard deviation,
- Point estimations and confidence intervals.

**Reading List**
See separate document.

**Examination**
Assessment is based on a written exam.

If students have a decision from Karlstad University entitling them to special pedagogical support due to a documented disability, the examiner has the right to give such students an adapted examination or to examine them in a different manner.

**Grades**
One of the grades U (Fail), 3 (Pass), 4 (Pass not without distinction), or 5 (Pass with distinction) is awarded in the examination of the course.

**Quality Assurance**
Follow-up relating to learning conditions and goal-fulfilment takes place both during and upon completion of the course in order to ensure continuous improvement. Course evaluation is partly based on student views and experiences obtained in accordance with current regulations and partly on other data and documentation. Students will be informed of the result of the evaluation and of any measures to be taken.

**Course Certificate**
A course certificate will be provided upon request.

**Additional information**
The local regulations for studies at the Bachelor and Master levels at Karlstad University stipulate the obligations and rights of students and staff.