



Course Specification Document

Title	General Algebra
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Credits	5 ECTS
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Aims	This course aims to introduce the student to complex numbers and their applications and polynomials and algebraic structures.
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Intended learning outcomes

On successful completion of this course, the student will be able to:

- Understand complex numbers and their applications in geometry.
- Recognize polynomials with real or complex coefficients.
- Recognize some useful algebraic structures.
- Use complex numbers and employ them in solving engineering problems.

Syllabus

- **Complex numbers:** Real and imaginary parts of a complex number, modulus, conjugate, inverse, argument of a complex number, the trigonometric form, DeMoivre's formula, the complex exponential function, roots of a complex number, affine transformations using complex numbers (translations, rotations, scaling and orthogonal reflections).
- **Polynomials:** Divisibility, quotient, remainder, the relation between coefficients and roots of a polynomial, Lagrange interpolation.
- **Algebraic structures:** Binary relations: equivalence relations, order relations (total vs partial order), binary operations, groups and subgroups, morphisms of groups, symmetric groups (groups of permutations), rings and fields, polynomials over a field.