



Faculty of Health, Science and Technology
Mathematics

Syllabus

Discrete Mathematics

Course Code:	MAGA55
Course Title:	Discrete Mathematics <i>Diskret matematik</i>
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 2017-08-30, and is valid from the Spring semester 2018 at Karlstad University.

Prerequisites

Foundation course in Mathematics, 7.5 ECTS cr and Calculus and Geometry 7.5 ECTS cr or Mathematics for Engineers I, 7.5 ECTS cr and Mathematics for Engineers II, 7.5 ECTS cr, or equivalent

Learning Outcomes

Upon completion of the course, students should be able to:

- use set theory symbols and model problems with set algebraic methods,
- use predicate calculus notation and give an account of the relation between propositional calculus and Boolean algebra,
- determine truth tables, disjunctive normal form, conjunctive normal form, minimal-sum-of-products for Boolean functions and corresponding combinatorial network write in Polish notation,
- use Euclid's algorithm to solve recursion equations, diofant equations,
- give an account of the concept relation and determine if a given relation is reflexive, symmetric, anti-symmetric or transitive,
- perform induction proof, determine equivalence classes and perform modulo operations,
- apply the basic methods and principles in combinatorics,
- use basic graph theory terminology and apply algorithms treated in the course, for example, Kruskal's algorithm, to solve graph theory problems, and
- perform course-related standard calculations reliably using correct terminology and appropriate denotations, and give a structured and logical account of the solution to a problem.

Content

The course comprises the following components:

- set theory, predicate and theorem calculus, Boolean algebra

- relations
- divisibility, modulo operations and diofant equations
- induction, recursion and algorithms
- combinatorics
- graph theory
- generating functions

Reading List

See separate document.

Examination

Assessment is based on a written exam. The number of assessment opportunities is limited to three per academic year.

Grades

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

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.

Required course for the Bachelor and Master of engineering programmes: Computer engineering