GHENT UNIVERSITY

Discrete Mathematics I (E001460)

Course size — *(nominal values; actual values may depend on programme)*

Credits 4.0   **Study time** 120 h

Course offerings and teaching methods in academic year 2023-2024

A (semester 1)	Dutch	Gent	lecture
			independent work
			seminar
			practical

Lecturers in academic year 2023-2024

| Pickavet, Mario | TWO5 | lecturer-in-charge |

Offered in the following programmes in 2023-2024	crdts	offering
Bachelor of Science in Engineering(main subject Biomedical Engineering)	4	A
Bachelor of Science in Engineering(main subject Chemical Engineering and Materials Science)	4	A
Bachelor of Science in Engineering(main subject Civil Engineering)	4	A
Bachelor of Science in Engineering(main subject Computer Science Engineering)	4	A
Bachelor of Science in Engineering(main subject Electrical Engineering)	4	A
Bachelor of Science in Engineering(main subject Electromechanical Engineering)	4	A
Bachelor of Science in Engineering(main subject Engineering Physics)	4	A
Bachelor of Science in Engineering (Joint Section)	4	A
Preparatory Course Master of Science in Bioinformatics(main subject Engineering)	4	A

Teaching languages

Dutch

Keywords

Logic, sets, algebraic structures, combinatorics, graphs

Position of the course

To gain insight in the fundamental algebraic and discrete structures. To acquiring the necessary basic logic mathematical reasoning and theorem proving.

Contents

- Sets, relations and functions: Elementary definitions, partition, cartesian product, Modulo calculus
- Algebraic structures: Binary operations and characteristics, Algebraic structures with 1 binary operation, Algebraic structures with 2 binary operations, vector spaces
- Logic: Propositional logic, Predicate logic, Strategies for mathematical proof, Application of logic in digital circuits
- Counting problems
- Graphs: Definitions and notations, Elementary graph problems and algorithms

Initial competences

- High school education.
- Basic Mathematics.

Final competences

1 Distinguishing and applying fundamental algebraic and discrete structures.
2 Using basic concepts from set theory, group theory, combinatorics and graph

theory.

3 Deploying mathematical reasoning and proof argumentation.

4 Evaluating logical reasonings with respect to correctness / identifying errors.

5 Deploying deductively correct reasonings in an independent way.

6 Being fluent in graph algorithms and applying them to real problem situations.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture, Practical, Independent work

Learning materials and price

Lecture notes (in Dutch, price about 5 to 10 Euro). Additional course material available electronically (on the electronic learning platform).

References

• nihil

Course content-related study coaching

The lecturer is available before and after classroom lectures. Personal coaching by the lecturer as scheduled. Additional tutoring services are available.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Written assessment open-book

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

• During semester / permanent evaluation: two mandatory written tests with open book (exact dates will be announced at the start of the semester).
• During examination period: written closed-book examination.

Calculation of the examination mark

Continuous assessment:
The scores on the two tests T1 and T2 (both marked out of 20), form a weighted score of respectively 40% and 60%, thus $T' = 0.4\,T1 + 0.6\,T2$

The total result of the permanent evaluation T, is determined as follows:
• if $T' < 10$ then $T = T'$
• if $10 \leq T' < 17$ then $T = T' + 3$
• if $T' \geq 17$ then $T = 20$

End-of-term evaluation: written examination (marked out of 20, score E)

Calculation of the final mark in the first-term examination period:
• If $E \geq 8$ then the final mark equals $\max(0.25\,T + 0.75\,E;\ 0.1\,T + 0.9\,E) - 2A$
• If $E < 8$ then the final mark equals $E - 2A$

A sets the number of tests (T1 and T2) for which the student was illegitimately absent (A = 0, 1 or 2). For each test in which the student did not participate, two points will be deducted from the final mark (2A = 0, -2 or -4).

Calculation of the final mark in the resit examination period:
• If $E \geq 8$ then the final mark equals $\max(0.25\,T + 0.75\,E;\ E)$
• If $E < 8$ then the final mark equals E