Course Specifications
Valid as from the academic year 2019-2020

Discrete Mathematics I (E001460)

Course

Course offerings and teaching methods in academic year 2019-2020
A (semester 1) Dutch
lecture 16.25 h
guided self-study 15.0 h
seminar: coached exercises 20.0 h
practicum 3.75 h

Course size (nominal values; actual values may depend on programme)
Credits 4.0 Study time 120 h Contact hrs 55.0 h

Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>Programmes</th>
<th>crds</th>
<th>offering</th>
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<tbody>
<tr>
<td>Bachelor of Science in Engineering (main subject Biomedical Engineering)</td>
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<tr>
<td>Bachelor of Science in Engineering (main subject Chemical Engineering and Materials Science)</td>
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<td>Bachelor of Science in Engineering (main subject Engineering Physics)</td>
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<tr>
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<td>A</td>
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<td>Joint Section Bachelor of Science in Engineering</td>
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<tr>
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<td>Preparatory Course Master of Science in Bioinformatics (main subject Engineering)</td>
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<td>Preparatory Course Master of Science in Biomedical Engineering</td>
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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

(Approved)
1 binary operation, Algebraic structures with 2 binary operations
- 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.
- Basis Mathematics Tools.

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
- Guided self-study, lecture, practicum, seminar: coached exercises

Learning materials and price
- Lecture notes (in Dutch). 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.

Evaluation methods
- end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
- Written examination

Examination methods in case of periodic evaluation during the second examination period
- Written examination

Examination methods in case of permanent evaluation
- Written examination, open book examination

Possibilities of retake in case of permanent evaluation
- 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 $T_1$ and $T_2$ (both marked out of 20), form a weighted score of respectively 40% and 60%, thus $T' = 0.4 T_1 + 0.6 T_2$

- 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 $\max(0.25 \cdot T + 0.75 \cdot E; 0.1 \cdot T + 0.9 \cdot E) - 2A$
• If $E < 8$ then the final mark equals $E - 2A$

$A$ sets the number of tests ($T_1$ and $T_2$) 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 $\max(0.25 \cdot T + 0.75 \cdot E; E)$
• If $E < 8$ then the final mark equals $E$