Course Specifications
Valid as from the academic year 2020-2021

Discrete Mathematics I (C003550)
Due to Covid 19, the education and evaluation methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

Course size

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
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</thead>
<tbody>
<tr>
<td>6.0</td>
<td>180 h</td>
<td>60.0 h</td>
</tr>
</tbody>
</table>

Course offerings and teaching methods in academic year 2020-2021

<table>
<thead>
<tr>
<th></th>
<th>Dutch</th>
<th>Gent</th>
<th>seminar: coached exercises</th>
<th>lecture</th>
<th>online lecture</th>
<th>online seminar: coached exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (semester 1)</td>
<td></td>
<td></td>
<td>30.0 h</td>
<td>30.0 h</td>
<td>0.0 h</td>
<td>0.0 h</td>
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Lecturers in academic year 2020-2021

Storme, Leo
WE16 lecturer-in-charge

Offered in the following programmes in 2020-2021

- Bachelor of Arts in Philosophy
  - crds: 6
  - offering: A
- Bachelor of Science in Mathematics
  - crds: 6
  - offering: A

Teaching languages

Dutch

Keywords

Logic, set theory, elementary combinatorics, prime numbers, modular arithmetic, algebraic structures, recurrence relations, generating functions.

Position of the course

The objectives of this course are twofold.
1. The prerequisites of the incoming students in mathematics are diverse. The aim of this course is to extend the preknowledge of the students in such a way that they are ready to attend successfully the other courses in mathematics within the curriculum. Some topics from logic, set theory and the theory of algebraic structures will be introduced in a systematic way such that it can immediately be applied in other courses. The way of setting up the course, will stimulate the student to be skilled in handling more abstract mathematical reasoning, without ignoring the applications to other mathematical and non-mathematical topics.
2. This course is part I of the package "Discrete mathematics" in the curriculum for the bachelor in mathematics. Within the mathematical framework that will be built up from chapter one, some very important topics from discrete mathematics will be treated. Emphasis will be put on elementary and more advanced techniques from combinatorics, (elementary) number theory and modular arithmetic, and an introduction to algebra.

Contents

- Chapter 1: Logic: propositional logic, predicate logic, some proof techniques.
- Chapter 2: Set theory, with a practical approach while mentioning the axiomatic set up; relations; maps and cardinalities.
- Chapter 3: Combinatorics: counting principles, combinations, variations, permutations and their variants allowing repetition, Stirling numbers of the second kind, multinomial numbers.
- Chapter 4: Number theory: foundations from elementary number theory; prime numbers, Fermat's little theorem, Euler's totient function, modular arithmetic, Chinese remainder theorem, quadratic congruences, the Legendre symbol.
Chapter 5: Algebraic structures: groups, rings, fields and skewfields; introduction to algebraic number theory: quadratic reciprocity.
Chapter 6: Recurrence relations and generating functions: linear recurrences, formal power series, generating functions, applications in combinatorial problems.

Initial competences

None

Final competences

1. Being able to use fluently topics from logic and set theory within other courses.
2. Being able to apply counting techniques.
3. Having insight in elementary number theory.
4. Being able to implement the knowledge on elementary algebra within the courses of Algebra, Discrete Mathematics, and Geometry.
5. Being able to think and reason in an abstract, logical and structured way.

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

Lecture, seminar: coached exercises, online lecture, online seminar: coached exercises.

Extra information on the teaching methods

Theory: many parts of the theory are presented by ex-cathedra lectures, but some parts are self-study. This is supported by the electronic learning environment UFORA. The theory lectures are given at the level of the first bachelor student and aim at a detailed treatment of the topics that need to be known. The lecture notes contain all the theory material.

Exercises: half of the contact hours are dedicated to exercises, made under supervision of the assistant. The exercise lectures are very much intended to have the students make actively exercises on the topics of the theory lectures.

Theory and exercises: because of COVID19, alternative didactic methods can be used when this is necessary.

Learning materials and price

A syllabus is available and sold. The price is the price of the printed paper including binding (15-20 Euro).

References


(Approved)

Course content-related study coaching
Students can always ask questions on the theory and the exercises. This is also possible on appointment or by email. There is interactive support via the electronic environment UFORA.

Evaluation methods
end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period
Written examination with open questions, oral examination

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions, oral examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation
not applicable

Extra information on the examination methods
Exams on theory are oral, while exams on exercises are written. The understanding, knowledge and skills are evaluated.
COVID19 measures can imply that the exam is a completely written exam.

Calculation of the examination mark
Theory 50%
Exercises 50%
Application deadline for Spring 2021: 30.10.2020. Application Form: the application form, a colour 35x45 mm photo, a copy of a valid passport (or ID for EU citizens), evidence of health insurance, evidence of sufficient means of subsistence, evidence of the reason for temporary stay (Application form). The mentioned documents should be translated into English or Croatian and delivered to a Croatian embassy.

Academic Student Support & Faculty Office Hours. Academic Year 2020-2021 Courses and Academic Policies FAQ. Open Study Spaces on Campus. International Students. The first day of classes will be February 1, 2021, postponed from the original start date of January 19, 2021. Spring break will be eliminated. Three instructional days off will be offered during the semester: Monday, February 15 (President’s Day); Wednesday, March 10; and Friday, April 2 (Good Friday).

Q. Are the attendance policies for my classes still valid? Will attendance be taken while classes are online? (July 29, 2020). Academic year 2020/21 guidelines. This leaflet does not replace the information available on the official Notice of competition and regulations. The articles of the Notice of Competition for Scholarship, Accommodation and Degree Award 2020/2021 are mentioned in the notes. More information available on EDISU website: www.edisu.piemonte.it. Step-by-step guidelines. Academic year 2020/2021 within the deadlines set by the individual University Institutions can apply for the first year of their two-year master’s degree. If the student fails to obtain the three-year degree by the date of the premise and enrolls in the first year out of the three-year course must produce, by 3 May 2021, a self-declaration attesting to the date of 10/08/2020 and his application will be considered as a grant application for the seventh semester and in the presence. Therefore, the credits mentioned above are valid only if provided for by the curriculum for the year of the degree course for which the student applies for the scholarship.