Summary
Study of structures and concepts that do not require the notion of continuity. Graph theory, or study of general countable sets are some of the areas that are covered by discrete mathematics. Emphasis will be laid on structures that the students will see again in their later studies.

Content
1. Elementary Combinatorics, counting.
2. Graphs, Trees.
3. Partially ordered sets, Set systems.
4. Generating functions.
5. Probabilistic method.

Keywords
Combinatorics, graphs, set systems

Learning Prerequisites
Required courses
Linear algebra, Analysis

Learning Outcomes
By the end of the course, the student must be able to:
• Analyze the structures
• Implement the systems
• Demonstrate the concepts for the discrete mathematics

Transversal skills
• Use a work methodology appropriate to the task.

Teaching methods
Ex cathedra lecture with exercises in the classroom.

Expected student activities
Solving homework problems

Assessment methods
Written exam.

Supervision
Office hours Yes
Assistants Yes

Resources
Bibliography

Ressources en bibliothèque
• Combinatorics : set systems, hypergraphs, families of vectors and combinatorial probability / Bollobás
• Invitation to Discrete Mathematics / Matousek
• Invitation aux mathématiques discrètes / Matousek
• Discrete Mathematics: Elementary and Beyond / Lovasz

Websites
• http://opac.nebis.ch/F/?local_base=nebis&con_Ing=FRE&func=find-b&find_code=020&request=0-201-55802-5
• http://opac.nebis.ch/F/?local_base=nebis&con_Ing=FRE&func=find-b&find_code=020&request=978-0-07-331271-2