

MATH-260(a) **Discrete mathematics**

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Cursus	Sem.	Type
Mathematics	BA2	Obl.

Contact language	English
Coefficient	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
<b>Hours</b>	<b>4 weekly</b>
Lecture	2 weekly
Exercises	2 weekly
<b>Number of positions</b>	

**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.
6. Linear Algebra 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 discrete structures
- Formulate main theorems of the course
- Solve typical combinatorial problems
- Prove main results of the course

**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

Weekly graded homeworks count as 40% of the final grade

Written exam counts as 60% of the final grade.

### Resources

#### Bibliography

Discrete Mathematics: Elementary and Beyond (L. Lovasz, J. Pelikan, K. Vesztergombi), Combinatorics: Set Systems etc. (B. Bollobas), Invitation to Discrete Mathematics (J. Matousek, J. Nešetřil).

#### Ressources en bibliothèque

- [Combinatorics : set systems, hypergraphs, families of vectors and combinatorial probability / Bollobás](#)
- [Discrete Mathematics: Elementary and Beyond / Lovasz](#)
- [Invitation aux mathématiques discrètes / Matousek](#)
- [Invitation to Discrete Mathematics / Matousek](#)

#### Moodle Link

- [https://go.epfl.ch/MATH-260\\_a](https://go.epfl.ch/MATH-260_a)