MATH-260(a)

Discrete mathematics

Viazovska Maryna

Cursus	Sem.	Type
Mathematics	BA2	Obl.

Language of teaching	English
Coefficient	4
Session	Summer
Semester	Spring
Exam	Written
Workload	120h
Weeks	14
Hours	**4 weekly**
Lecture	2 weekly
Exercises	2 weekly
Number of positions	

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. Nesetril).

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