ÓBUDA UNIVERSITY						
John von Neumann	*Faculty*	**Applied Mathematics**				*Institute*
Hungarian title of the course:	**Diszkrét matematika**				*Neptun code:*	**NMXDM1PMNE**
English title of the course:	**Discrete mathematics**				*Credit:*	**5**
Type (compulsory/obligatory:)	**compulsory**	*Education Type*	**Full-time**	*Semester :*		**2021-22 1.**
Study field:	**Combinatorics, graph heory**					
Lecturer:	**Dr. Gábor Hegedüs**					
Required preliminary knowledge:	**-**					
Weekly teaching hours:	*Lecture:*	**2**	*Practical work:*	**1**	*Laboratory work:*	**0**
Exam type:	**w**	*Language of course:*	**English**	*In timetable:*	**y**	

CURRICULUM

Abstract:

Principle of mathematical induction, pigeonhole principle, principle of inclusion and exclusion,
Permutations, variations and combinations, binomial theorem,
Genrating functions and their basic properties,
Linear recurrence relations,
Stirling, Catalan, Bell and Fibonacci sequences,
The basic properties of graphs, subgraphs, complements and graph isomorphism
Trees, forests, Prüfer code,
Euler trails and circuits, Hamilton path and cycles, Ore's theorem, Posa's theorem, extreme graph theory, Turán's theorem,
Graph coloring, Brooks' theorem, Vizing's theorem, perfect graphs, planar graphs, dual graphs, Kuratowski's theorem,
Mathing theory, Hall's theorem, Könug's theorem, Gallai's theorem, Hungarian method, flows,
max-flow min-cut theorem

Detailed schedule of the course:

***Topics of lectures**:*

No.	Date	Description
1.	09.09	Principle of mathematical induction, pigeonhole principle, principle of inclusion and exclusion
2.	16.09	Permutations, variations and combinations, binomial theorem
3.	23.09	Genrating functions and their basic properties
4.	30.09	Linear recurrence relations
5.	07.10	Stirling, Catalan, Bell and Fibonacci sequences
6.	14. 10	First midhalf test

7.	21.10	The basic properties of graphs, subgraphs, complements and graph isomorphism
8.	28.10.	Trees, forests, Prüfer code
9.	04.11.	Euler trails and circuits, Hamilton path and cycles, Ore's theorem, Posa's theorem, extreme graph theory, Turán's theorem
10.	11.11.	graph coloring, Brooks' theorem, Vizing's theorem, perfect graphs, planar graphs, dual graphs, Kuratowski's theorem
11.	18.11	No lecture
12	25.11	Mathing theory, Hall's theorem, König's theorem, Gallai's theorem, Hungarian method, flows, max-flow min-cut theorem
13	02.12	2. midhalf paper
14	09.12	1. repairing paper
Practical work:		
No.	Date	
1.	09.09	Principle of mathematical induction, pigeonhole principle, principle of inclusion and exclusion
2.	16.09	Permutations, variations and combinations, binomial theorem
3.	23.09	Genrating functions and their basic properties
4.	30.09	Linear recurrence relations
5.	07.10	Stirling, Catalan, Bell and Fibonacci sequences
6.	14. 10	First midhalf test
7.	21.10	The basic properties of graphs, subgraphs, complements and graph isomorphism
8.	28.10.	Trees, forests, Prüfer code
9.	04.11.	Euler trails and circuits, Hamilton path and cycles, Ore's theorem, Posa's theorem, extreme graph theory, Turán's theorem
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14	09.12	1. repairing paper

Requirements

Attendance at lectures:

It is compulsory to attend the lectures. The rules of education and exam directory (TVSZ) are the guidelines.

Exams and tests (types, data)

All exams are written.

Requirements for qualification:

The students can get the lecturer's signature just in case if they wrote both test papers.

To admit the exam tests that can be acquired in two mid(half)test papers **writing score (100 points) must be at least 50% over.**

In the mid(half)year written test papers theoretical issues and task problems are included. The theoretical issues are the material of the lectures and/or the board exercises.

If both mid(half)year test papers are written by the student, then he gets an opportunity for repeating the weaker mid(half)year test paper on 14. week.

In this case the total points will be calculated based on the corrective (and no the original) mid(half) year test paper.

If the student both mid(half) year tests wrote, but did not achieve the 50 points needed to be admitted to the exam test, then during the first two weeks of the exam period once a pre-specified time may attempt to repair. Then he needed to write from the material of the whole semester and the obtainable score of 50% must be achieved to be admitted to. The student may enter the repair procedure through the „Neptun" system with paying the special charge fee for the repair procedure.

Type of exam (written, oral, tests etc.) and the method of assessment:

Type of the exam test: in written form.

It is possible to give recommendable marks to the students if the student wrote both mid(half) year tests and achieved the 50 points needed to be admitted to the exam test. The following result of the sum of the points of the midhalf tests determines the following grades:

74-100 point: class (5)

50-73 point: fine (4).

The examination test consists of theoretical and practical parts: theoretical questions to answer for a maximum of 50 points, the practical tasks will be for a maximum of 50 points. The total score on the exam test received from the points of the theoretical questions and plus of the practical tasks received.

The resulting point sum can be determined by the Grade exam in the following table:

Total point for tests	**The colloquium given grade**
86–100	class (5)
74–85	fine (4)
62–73	fair (3)
50–61	sufficient (2)
0–49	insufficient (1)

Literature	
Compulsory:	◆ PPT files on the homepage of institute
Recommended:	◆ Graham, Ronald L., Donald E. Knuth, and Oren Patashnik. "Concrete Mathematics " *Massachusetts: Addison-Wesley*
Others:	◆ Grimaldi, Ralph P. *Discrete and Combinatorial Mathematics, 5/e*. Pearson Education India, 2003.
Quality Management	
The structure of the course is harmonized with other lecturers from different universities. Assessment of students is carried out at every lecture, and at the end of semester. The ppt files are continuously renewed according to the new literature data.	

Date:. 01.09.2021.

Lecturer: **Dean:**