

Discrete Mathematics

Course Information, Spring Semester 2023-24 for students of Computer Science

I kindly ask everyone who is taking this course this semester to carefully read and save this course information for later study. During the semester, I will not be able to respond to emails for which the answer is clearly evident from what is written here.

1. Course Details

Course Title:	Discrete Mathematics
Course Code:	BAI0174
Location and Time of Lectures:	B248A, Mondays 10:00–11:30
Lecturer, Practicum Leader:	Gábor Marcell Molnár, ✉ molnar.gabor@nye.hu (email me in advance)
Office Hours:	Mondays 11:30-12:00, (Building B, Office 241 on Floor A)

2. Requirements

Active participation in the practicums is mandatory. The course concludes with a practical grade. To obtain a grade, both tests are essential, **each with a minimum of 20-20% completion**. If this condition is met, the final grade is the arithmetic mean of the percentages obtained in the two tests, as indicated below.

The tests are planned for the 6th and 13th weeks during the practicums. There will be an opportunity for retakes in the 14th week. **Retakes are allowed only once**. There are three options for retakes: from the material of the first exam, the second exam, or both. Those who wish to retake must indicate their choice in advance in writing, using the form available on the course Moodle page. **In all cases, the result of the retake overrides the original test result** (meaning, it is possible to worsen the grade in certain cases). If someone chooses to retake both tests, the result overrides the grades of both previous tests.

Excellent (5):	85 – 100%
Good (4):	70 – 85%
Average (3):	55 – 70%
Satisfactory (2):	40 – 55%
Fail (1):	0 – 40%

Example. Person A scored 19% on the first test, and 62% on the second test. Despite the average of the two tests being $(19 + 62)/2 = 40.5$, Person A still needs to retake the first test (or both) to achieve at least a 20% score on each test.

Example. Person B scored 23% on the first test, and 49% on the second test. Since the average of two tests is $(23 + 49)/2 = 37 < 40$, Person B needs to retake at least one of the test to achieve at least 40% average.

3. Topics, Weekly Breakdown

Basic concepts of set theory. Subset. Set operations and their properties. Relations and mappings. Algebraic structures. Some types of structures. Group, ring, free semigroup and group. Permutation groups. Implications of associativity and distributivity. Boolean algebra. Number theory basics. Divisibility and euclidean division of integers. Unique prime factorization theorem for integers. Prime numbers. Number theoretical functions. Number systems. Linear Diophantine equation with two unknowns. Congruence. Theorem of Euler and Fermat. Linear congruence equation. Polynomial rings. Divisibility and euclidean division of polynomials. Unique prime factorization theorem for polynomials. Fields. Rational numbers and their decimal fraction form. The fields of real and complex numbers. Operations with complex numbers. Fundamental theorem of algebra. Solution of quadratic and cubic equations. Finite fields. Basics of graph theory, trees, the shortest path, travelling salesman. Eulerian path and Hamiltonian cycle.

4. Recommended Literature

1. Kenneth H. Rosen: Discrete Mathematics and Its Applications
2. L. Lovász, J. Pelikán, K. Vesztergombi: Discrete Mathematics
3. Ágnes Szendrei: Discrete Mathematics
4. Róbert Freud, Edit Gyarmati: Number Theory

5. Other Expectations

For all other matters not addressed in this course information, the Study and Examination Regulations of the University of Nyíregyháza, as well as the Code of Ethics of the University of Nyíregyháza, shall prevail.

February 19, 2024

Molnár Gábor Marcell

Flowchart of the course

