Discrete Mathematics
(MBBL014)
Course Syllabus

Instructor: Prof. Dr. Vladimir A. Tolstykh

Office hours: Thursday, 13:25–14:45 (by appointment).

Quizzes: there will be three 30-35 min. quizzes during the semester (once a month).

Homeworks: to be submitted in the university's online education system (UZEM), once a fortnight.

Final grade (course policy): $60\% \cdot \mathrm{CW} + 40\% \cdot \mathrm{FE}$, where FE is the final exam grade and CW is the coursework grade. The coursework grade is calculated as follows:

$$\mathrm{CW} = 35\% \cdot \mathrm{ME} + 25\% \cdot \mathrm{HW} + 25\% \cdot \mathrm{ATT} + 15\% \cdot \mathrm{QZ}$$

where ME is the midterm examination grade, HW is the grade for homeworks, QZ is the overall grade for quizzes and ATT is the attendance (please be advised that *insufficient attendance may lead to the failure in the course*). Thus the final grade FG is calculated as follows:

$$\mathrm{FG} = 21\% \cdot \mathrm{ME} + 15\% \cdot \mathrm{HW} + 15\% \cdot \mathrm{ATT} + 9\% \cdot \mathrm{QZ} + 40\% \cdot \mathrm{FE}.$$

roughly speaking, any missed two-hour lecture takes away about 0.5 points from the final grade, any unattended quiz 3 points, an unsubmitted homework about 2.5 points, etc.

Textbook: Seymour Lipschutz, Marc Lipson, *Schaum's outline of theory and problems of discrete mathematics*, 3 ed., McGraw-Hill, 2007.

(1) Set theoretic-operations [1, Sect. 1.1–1.4].
(2) Cardinalities of finite sets [1, Sect. 1.6].
(3) Mathematical induction [1, Sect. 1.8].
(4) Relations, pictorial representation, directed graphs [1, Sect. 2.1–2.4].
(5) Matrices of relations, compositions of relations [1, Sect. 2.4–2.5].
(6) Reflexive, symmetric, antisymmetric and transitive relations [1, Sect. 2.6–2.7].
(7) Equivalence relations [1, Sect. 2.8].
(8) *Midterm week*.
(9) Functions as relations [1, Sect. 3.1–3.6].
(10) Propositional logic. Logical connectives [1, Sect. 4.1–4.3].
(11) Truth tables [1, Sect. 4.4–4.5].
(12) Laws of the algebra of propositions [1, Sect. 4.7].
(13) Arguments and inference rules [1, Sect. 4.9].
(14) Basics of the first-order logic [1, Sect. 4.10–4.11].