Syllabus

I. Course name: Abstract Algebra

II. Course description and objective

The course is devoted to group theory, including basic and some more advanced concepts.

III. Compulsory

IV. Bachelor Program, 6th term, 64 hours, 4 credits

V. Course content

Section 1. Basic concepts of group theory.

Definition of a group. Examples of groups. Subgroups. Lagrange's theorem. Orders of group elements. Cyclic groups. Group homomorphisms. Normal subgroups. Quotient groups. Direct product of groups.

Section 2. Structure of groups.

Abelian groups. Classification of finitely generated abelian groups. Free groups. Generators and relations. Group actions. Sylow theorems. Groups of order pq.

Section 3. Application of finite groups in combinatorics.

Burnside's lemma. Pólya's counting theory.

VI. Pre-taken courses

Elements of Algebra and Number Theory, Linear Algebra

VII. Form of the final test: examination (four-level evaluation scale)

VIII. Teaching materials and reference books

1. E. B. Vinberg, A Course in Algebra, AMS, 2003.
2. E. Karolinsky, B. Novikov. Exercises in Group Theory, Lugansk, 2003 [in Russian].

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