אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2019–20–A term

Course Name Algebraic Structures

Course Number 201.1.7031

Course web page
`https://math.bgu.ac.il//en/teaching/fall2020/courses/algebraic-structures`

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Office Hours `https://math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

- Groups as symmetries. Examples: cyclic, dihedral, symmetric and matrix groups.
- Homomorphism. Subgroups and normal subgroups. Quotient groups. Lagrange's theorem. The isomorphism theorems. Direct products of groups.
- Actions of groups on sets. Cayley's theorem.
- Group automorphisms.
- Sylow's theorems. Application: classfiication of groups of small order.
- Composition series and Jordan–Hoelder theorem. Solvable groups.
- Classfiication of finite abelian groups, finitely-generated abelian groups.
- Symmetric group and alternating group. The alternating group is simple.
- Rings, maximal and prime ideals, integral domain, quotient ring. Homomorphism theorems.

[1] Information may change during the first two weeks of the term. Please consult the webpage for updates

- *Multilinear algebra*: Quotient spaces. Tensor products of vector spaces. Action of S_n on tensor powers. Exterior and symmetric algebras. Multilinear forms and determinant.
- *Optional topics*: group of symmetries of platonic solids, free groups, semidirect products, representation theory of finite groups.