

# Abstract Algebra: The Theory of Groups

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## Syllabus 2014

**Aim of the course:** To get students to understand group theory without going too much into the rigor of proofs but rather to develop their intuition regarding the topic.

**My reference book:** Contemporary Abstract Algebra, 7<sup>th</sup> Edition, J. Gallian (there are many more books!)

### Topics of study:

1. “What is a group?”
2. “What is the reason for the existence of groups?”
3. “How does its existence make me happy?”

**“What is a group?”**- Definition of a group, examples of groups, introduction to symmetry, properties of groups, history of groups (very briefly!).

**“What is the reason for the existence of groups?”**- A few applications (just mere introduction), symmetry, cyclic groups, permutation groups.

**“How does its existence make me happy?”**- Finite groups, subgroups and their tests, homomorphism (very briefly), isomorphism, cosets, Lagrange’s theorem, external direct product, factor groups, Fundamental theorem of finite abelian groups (not too involved).

**The catch of the course:** To understand the power and beauty of mathematics and life in general, and how one can really know all there is to know by asking the questions to themselves!

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