The Department of Mathematics
2021–22–B term

Course Name  Model theory and applications

Course Number  201.2.2141

Course web page
https://www.math.bgu.ac.il/en/teaching/spring2022/courses/model-theory-applied

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

Abstract

The course, devoted to model theory and its applications, aims to present the
foundations of the subject, including the basic notions and results in first-order
model theory. The course will cover advanced topics such as
transcendental extensions, model completeness, model quantifier elimination,
and applications to differential fields and differential Galois theory.

Requirements and grading

The course will be graded based on participation, presentations, and a final project.

Course topics

The aim of the course is to present applications of model theory (a branch of
Mathematical Logic) in one or more area of mathematics. The particular direction
will be determined by coordination with the students, but might include the
following:

Information may change during the first two weeks of the term. Please consult the webpage
for updates.
• Algebraic theory of differential equations (Galois theory, dimension, classification in dimension 1)

• Model theory of valued fields (imaginaries, integration theory, analytic spaces)

• o-minimality, with applications to arithmetic

• Difference fields and difference equations, applications to dynamics, asymptotic theory of the Frobenius

• Continuous model theory, applications to operator algebras, probability etc. Background from logic and other relevant areas will be covered as necessary.