

## The Department of Mathematics

2020–21–A term

**Course Name** O-minimality: topology without pathologies

**Course Number** 201.1.6141

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2021/courses/o-minimality>

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

### Abstract

### Requirements and grading<sup>1</sup>

### Course topics

In the 1980s A. Grothendieck suggest a project for developing a tame topology that will not suffer from the many counter-examples and pathologies known in classical topology. Nowadays many view the notion of o-minimality as successful fulfillment of this program: in o-minimal fields all (unary) functions are piecewise differentiable (and therefore infinitely differentiable at almost every point); unary functions are piecewise monotone, connectedness is the same as path connectedness and the axiom of choice holds for definable sets. In the o-minimal setting most of the classical differential calculus can be developed, and so are large portion of the theory of Lie groups, algebraic topology and much more. O-minimality plays a key role in real geometry and in recent years had a crucial role in important breakthroughs in Diophantine geometry and in Hodge theory.

In the course we will define o-minimality and develop its basic theory. We will show that real closed fields are o-minimal and discuss – time permitting – some applications.

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<sup>1</sup>Information may change during the first two weeks of the term. Please consult the webpage for updates