

## The Department of Mathematics

2017–18–A term

**Course Name** Infinitesimal Calculus 1

**Course Number** 201.1.0011

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2017/courses/infinitesimal-calculus->

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

### Abstract

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

### Course topics

1. Real numbers (axiomatic theory). Supremum and Infimum of a set. Existence of an  $n$ -th root for any  $a > 0$ .
2. Convergent sequences, subsequences, Cauchy sequences. The Bolzano-Weierstrass theorem. Upper and lower limits.
3. Series. Partial sums, convergent and divergent series, Cauchy criterion. Series of non-negative terms. The root and the ratio tests. Series of arbitrary terms. Dirichlet, Leibnitz, and Abel theorems. Rearrangements of series. The Riemann Theorem.
4. The limit of a function. Continuous functions. Continuity of the elementary functions. Properties of functions continuous on a closed interval. Uniformly continuous functions. Cantor's theorem.
5. The derivative of a function. Mean value theorems. Derivatives of higher order. L'Hospital's rule. Taylor's theorem.

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