

## The Department of Mathematics

2019–20–A term

**Course Name** Introduction to Analysis

**Course Number** 201.1.1051

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2020/courses/introduction-to-analysis>

**Lecturer** Prof. Izhar Oppenheim, <izharo@bgu.ac.il>, Office 316

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

### Abstract

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

### Course topics

Metric and normed spaces. Equivalence of norms in finite dimensional spaces, the Heine-Borel theorem. Convergence of sequences and series of functions: pointwise, uniform, in other norms. Term-by-term differentiation and integration of series of functions, application to power series. Completeness: completeness of the space of continuous functions on a closed interval and a compact metric space. The Weierstrass  $M$ -test. The Baire category theorem and applications, bounded linear functionals and the Banach-Steinhaus theorem. Compactness in function spaces and the Arzela-Ascoli theorem. Introduction to Fourier series: Cesaro means, convolutions and Fejer's theorem. The Weierstrass approximation theorem.  $L^2$  convergence. Pointwise convergence, the Dirichlet kernel and Dini's criterion.

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