

## The Department of Mathematics

2020–21–A term

**Course Name** Workshop in Analysis

**Course Number** 201.1.1071

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/fall2021/courses/workshop-in-analysis>

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

### Abstract

The goal of the workshop is to examine and provide complimentary material for the course “Geometric Calculus”<sup>1</sup> 201.1.1031 (as well as the course “Introduction to Analysis” (201.1.1051). The workshop is given in parallel with Geometric Calculus, 1 and the workshop content follows the courses. Part of the main goals of the workshop, especially due to the Corona pandemic, is to improve the student’s teamwork skills. During the workshop, the students will work in small groups and will practice their “mathematical conversation” skills: how to think together, how to find the essence of an idea and how to present a mathematical idea to others.

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

הקורס כולל מפגשים בהם נדרשת, השתתפות אקטיבית של הסטודנטים. אין מבחן סופי בקורס ואין חובת הגשת תרגילים וציון הקורס נקבע על פי נוכחות והשתתפות בשיעור. הסטודנטים יתבקשו לעבוד בקבוצות קטנות (בליווי והנחיה של המרצה) על שאלות הנוגעות לחומר הנלמד בקורס אינפי גיאומטרי 1 (ולעיתים מהקורס מבוא לאנליזה). הקבוצות מצופות לגבש פתרון ולהציג אותו לפני שאר הקבוצות.

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

## Course topics

This course is meant to discuss problems and provide examples in the following topics. Close coordination with the parallel course Geometric Calculus 1<sup>2</sup> is recommended.

- .1 Topology of  $\mathbb{R}^n$ : open, closed, compact and connected sets.
- .2 Continuity and differentiability of functions from  $\mathbb{R}^m$  to  $\mathbb{R}^n$ , including the basic geometric properties of directional derivatives and the gradient. Curves in  $\mathbb{R}^n$ .
- .3 Implicit and inverse function theorems
- .4 Taylor's theorem for multivariable functions and the Hessian
- .5 Extrema for multivariable functions, with and without constraints
- .6 Fubini's theorem and the change of variables formula

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<sup>2</sup>[https://www.math.bgu.ac.il/teaching/generic\\_courses/geoemtric-infi-1/](https://www.math.bgu.ac.il/teaching/generic_courses/geoemtric-infi-1/)