Course Name  Workshop in Analysis

Course Number  201.1.1071

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

Lecturer  Dr. Yair Hartman, <hartmany@bgu.ac.il>, Office 207

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 1” 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

The course includes meetings where the students will actively participate. There is no final exam in the course and the grade is determined by the number of attendance and participation in the lectures. The students are expected to work in small groups (under the guidance of the lecturer) on questions related to the material covered in the course (and sometimes in the previous course). The groups are expected to present their solutions in front of the class.

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 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