

## The Department of Mathematics

2022–23–B term

**Course Name** Geometric infinitesimal calculus 2

**Course Number** 201.1.1041

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/spring2023/courses/geoemtric-infi-2>

**Lecturer** Prof. Michael Levin, <mlevine@bgu.ac.il>, Office 216

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

### Abstract

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

### Course topics

Embedded differentiable manifolds with boundary in Euclidean space. The tangent space, normal, vector fields. Orientable manifolds, the outer normal orientation. Smooth partitions of unity. Differential forms on embedded manifolds, the exterior derivative. Integration of differential forms and the generalized Stokes theorem. Classical formulations (gradient, curl and divergence and the theorems of Green, Stokes and Gauss). Closed and exact forms. Conservative vector fields and existence of potentials. Application to exact ordinary differential equations. Introduction to differential geometry: curvature of curves and surfaces in 3 dimensional space, the Gauss map, the Gauss-Bonnet theorem (time permitting).

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