

## The Department of Mathematics

2021–22–B term

**Course Name** Calculus 2 for Information Systems

**Course Number** 201.1.9761

**Course web page**

<https://www.math.bgu.ac.il/en/teaching/spring2022/courses/calculus-2-for-information-systems>

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

### Abstract

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

### Course topics

1. Analytic geometry in space. Vector algebra in  $R^3$ . Scalar, cross and triple product and their geometric meaning. Lines, planes and quadric surfaces in space including the standard equations for cones, ellipsoids, paraboloids and hyperboloids.
2. Functions of several variables. Graphs and level curves and surfaces. Limits and continuity. Properties of the continuous functions on a closed bounded domain. Partial derivatives. The plane tangent to graph of the function. Differentiability, the total differential and the linear approximation. Differentiability implies continuity. The chain rule. The gradient vector and the directional derivative. Tangent plane and the normal line to a surface at a point. 201.1.9761
3. Maxima and minima for functions of several variables. Higher-order partial derivatives and differentials. Taylor's formula. Local extrema and saddle points. Necessary conditions for local maxima and minima of a differentiable function. Sufficient conditions for local maxima and minima via the Hessian. Global extrema in closed bounded sets. Lagrange Multipliers.

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



4. Double integrals . Double integrals on rectangles. Connection with the volume. Properties and evaluation of double integrals in non-rectangular domains. Iterated integrals and change of order of integration. Change of variables formula for the double integral and the Jacobian. Double integrals in polar coordinates. Applications of the change of variables formula to the computation of area.