אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics
2024–25–B term

Course Name Calculus 2 For Computer Science and Software Engineering

Course Number 201.1.2371

Course web page
https://math.bgu.ac.il//en/teaching/spring2025/courses/calculus-2-for-computer-s

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Office Hours `https://math.bgu.ac.il/en/teaching/hours`

Abstract

Requirements and grading[1]

Course topics

.1 Integral calculus in one variable and its application: the integral, Riemann sums, integrability of bounded functions with countably many discontinuity points (the proofs only for continuous functions and monotone functions), antiderivatives and the Fundamental Theorem of Calculus, change of variables and integrations by parts, partial fractions (without proofs). Applications of integral calculus: computation of areas, volume of the solid of revolution, the length of a smooth curve. Improper integral, and convergence tests for positive functions, application to series.

.2 Functions of several variables: open, closed, and compact sets, level curves and surfaces, vector valued functions, paths and path-connectedness.

.3 Limits and continuity in several variables: arithmetic of limits, Weierstrass theorem, intermediate value theorem.

.4 Multivariable dffierential calculus: partial and directional derivatives, dfiferentiability and the tangent plane, the chain rule, the orthogonality of the gradient to the level surfaces, implicit function theorem for a curve in the

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[1]Information may change during the first two weeks of the term. Please consult the webpage for updates

plane and a surface in the space (without a proof), the Hessian, Taylor approximation of order ‚2 critical points (classfiication only in dimension ‚(2 Extremum problem, including Lagrange multipliers and gradient descent.

5. Integration in dimension :2 Reimann integral in dimension ‚2 change of variables and Fubini theorem (without proofs), changing the order of integration, polar coordinates, computation of volumes. If time permits: integration in dimension .3