אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2022–23–B term

Course Name Calculus 1 for Computer Science and Software Engineering

Course Number 212.1.2361

Course web page
`https://www.math.bgu.ac.il//en/teaching/spring2023/courses/calculus-1-for-computer-science-and-software-engineering`

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

Abstract

Requirements and grading[1]

Course topics

The system of the real numbers (without Dedekind cuts). The supremum axiom. Convergent sequences, subsequences, monotonic sequences, upper and lower limits. Series: partial sums, convergent and divergent series, examples, nonnegative series, the root test, the quotient test, general series, Dirichlet, Leibnitz, absolute convergence implies convergence (without a proof). Limits of functions, continuity, the continuity of the elementary functions, extrema in compact intervals. The derivative of a function, Lagrange's Mean Value Theorem, high order derivatives, L'hospital's rules, Taylor's Theorem, error estimates, lots of examples. The Riemann integral: only for piecewise continuous functions (finitely many points of discontinuity). Riemann sums and the definition of the integral, The Fundamental Theorem of Calculus, the existence of primitive functions (anti-derivatives). Integration techniques: integration by parts, substitutions, partial fractions (without proofs), improper integrals, applications of integrals, estimation of series with the aid of integrals, Hardy's symbols O, o and Omega, approximation of momenta and the Stirling formula.

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