אוניברסיטת
בן-גוריון בנגב

The Department of Mathematics

2017–18–B term

Course Name Calculus 1 for Computer Science and Software Engineering

Course Number 201.1.2361

Course web page
https://www.math.bgu.ac.il//en/teaching/spring2018/courses/calculus-1-for-computer-science-and-software-engineering

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

Abstract

Requirements and grading[1]

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.

Course topics

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

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.