

The Department of Mathematics

2022–23–B term

Course Name Calculus 1 for engineering

Course Number 201.1.9711

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2023/courses/differential-and-integral-calculus-me1>

Lecturer Dr. Natalia Gulko, <gulko@post.bgu.ac.il>, Office מיונס 108

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

Abstract

Requirements and grading¹

Course topics

In this course the basic concepts of one-dimensional analysis (a limit, a derivative, an integral) are introduced and explored in different applications: graphing functions, approximations, calculating areas etc.

1. Limit of a function, continuity.
2. Derivative, basic derivative formulas.
3. Derivative of an inverse function; derivative of a composite function, the chain rule; derivative of an implicit function.
4. Derivatives of high order.
5. The mean value problem theorem. Indeterminate forms and l'Hopital's rule.
6. Rise and fall of a function; local minimal and maximal values of a function.
7. Concavity and points of inflection. Asymptotes. Graphing functions.

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



8. Linear approximations and differentials. Taylor's theorem and approximations of an arbitrary order.
9. Indefinite integrals: definition and properties.
10. Integration methods: the substitution method, integration by parts.
11. Definite integrals. The fundamental theorem of integral calculus (Newton-Leibniz's theorem).
12. Calculating areas.

Bibliography Thomas & Finney, *Calculus and Analytic Geometry*, 8th Edition, Addison-Wesley (World Student Series).