

The Department of Mathematics

2017–18–B term

Course Name Calculus 1 for engineering

Course Number 201.1.9711

Course web page

<https://www.math.bgu.ac.il/en/teaching/spring2018/courses/differential-and-integral-calculus-me1>

Lecturer Dr. Irena Lerman, <lerman@post.bgu.ac.il>, Office

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

Abstract

Requirements and grading¹

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. .8 Linear approximations and differentials. Teylor'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).

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

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.
- .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).