

## The Department of Mathematics

2017–18–B term

**Course Name** Calculus 1 for engineering

**Course Number** 201.1.9711

**Course web page**

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

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

### Abstract

### Requirements and grading<sup>1</sup>

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).

### 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

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

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).