

MTH G102 - Analysis 2

Instructor: Maxim Braverman 457 LA, ext. 8769

Class hours: MW 5:50-7:20 PM **Location:** 4 SH

Textbook: I will use different books for different parts of the course and will distribute printouts after each class. A big part of the course will follow the book "Mathematical Analysis" by Andrew Browder

Prerequisites: Analysis 1, Linear Algebra.

Grading: Weekly homework problems may be done collaboratively. The take-home final exam must be entirely your own work.

Course Description:

In the first part of the course I will discuss some elements of multivariable integration theory on \mathbf{R}^n and on manifolds. In particular I will introduce differential forms and prove the general Stokes' theorem. Then I will discuss elements of vector analysis and show that classical Green's, Gauss-Ostrogradski's, and Stokes' Theorems are particular cases of the general Stokes' theorem for differential forms.

In the second part of the course I will present the basic theory of functions of one complex variable. In particular, the methods of computing integrals using complex analysis will be presented.

Main topics to be covered:

1. Introduction to Manifolds.
2. Tensor Algebra, Exterior Algebra. Tensor and Vector Fields on Manifolds.
3. Stokes' Theorem for Differential Forms and its consequences (classical Green's, Gauss-Ostrogradski's, and Stokes' Theorems)
4. Calculus of Vector Fields on Manifolds. Harmonic functions.
5. Functions of one complex variables. Holomorphic functions.
6. Cauchy integral formula. First properties of holomorphic functions.
7. Classification of singular points of complex analytic functions.
8. The residue formula. Computing of integrals using complex analysis.
9. Analytic continuation. Computing integrals using multivalued analytic functions.