

**Catalog Description:**

4181H and 4182H is an enriched honors sequence introducing students to mathematical underpinnings of calculus. 4181H is the first of the calculus sequence designed to introduce students to the mathematical underpinnings of analysis. 4182H is a continuation with a rigorous treatment of multivariable calculus including gradients, multiple integrals, line and surface integrals, Green's theorem, the divergence theorem, and Stokes' Theorem.

**Prerequisite:**

**4181H:** Permission of department.

**4182H:** B- or better in 4181H, or permission of department.

**Purpose of Course:**

This two-semester sequence comprises the most intensive first year honors track in mathematics. It is designed to challenge talented, highly motivated students, regardless of their chosen major area of study. The courses introduce students to the mathematical underpinnings of calculus and stimulate the development of mathematical thinking, in addition to covering the material of the traditional calculus sequence. 4181H and 4182H will fulfill the analysis requirement for a Math major. The sequence is taught by faculty members in small sections with considerable teacher-student interaction.

**Text:**

4181H: *Calculus*, 4<sup>th</sup> edition, by Spivak, published by Publish or Perish, ISBN: 9780914098918

4182H: *Advanced Calculus*, by Folland, published by Pearson, ISBN: 9780130652652

**Topics List:****4181H:**

1. Properties of real numbers
2. Mathematical induction
3. Definition of integral
4. Integrals of polynomials and trigonometric functions.
5. Applications
6. Continuity, limits, derivatives and applications
7. Fundamental Theorem of Calculus and integration techniques
8. Taylor series
9. Sequences and series of numbers and functions
10. Uniform convergence
11. Power series
12. If time permits, some differential equations or complex-valued functions.



**4182H:**

1. Multivariable calculus (vector approach)
2. Gradients
3. Multiple integrals
4. Line and surface integrals
5. Green's Theorem
6. Divergence theorem
7. Stokes' Theorem.