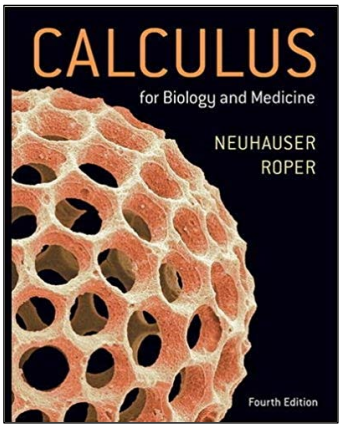
Department of Mathematics
Johns Hopkins University

AS.110.106 Calculus I (Bio. & Soc. Sci.) Course Syllabus

The following list of topics is considered the core content for the course 110.106 Calculus I (Biology and Social Sciences). The current text for the course is:

Text: **Calculus for Biology and Medicine,** *4th Edition*, C. Neuhauser and M. Roper, New Jersey: Prentice Hall, January 2018, ISBN-10: **0134070046**, ISBN-13: **978-0134070049.**

Course Topics



- **Review Basic Properties of Functions (2- weeks)**
  - Chapter 1
  - 2.1 Exponential Growth and Decay
  - 2.2 Sequences
- **Limits and Continuity (2 weeks)**
  - 3.1 Limits (with formal definition from 3.6)
  - 3.2 Continuity
  - 3.3 Limits at Infinity (with formal definition from 3.6)
  - 3.4 Trigonometric Limits and The Sandwich Theorem
  - 3.5 Properties of Continuous Functions
- **Derivatives (3- weeks)**
  - 4.1 Formal Definition of the Derivative
  - 4.2 Basic Rules of Derivatives
  - 4.3 Power Rule and the Rules of Differentiation
  - 4.4 Product and Quotient Rules
  - 4.5 The Chain Rule
  - 4.6 Implicit Functions and Implicit Differentiation
  - 4.7 Higher Derivatives
  - 4.8 Derivative of Trigonometric Functions
  - 4.9 Derivatives of Exponential Functions
  - 4.10 Derivatives of Inverse Functions
  - 4.11 Linear Approximation
- **Applications of Differentiation (2+ weeks)**
  - 5.1 Extreme and Mean Value Theorems
  - 5.2 Monotonicity and Concavity
  - 5.3 Extrema and Inflection Points
  - 5.4 Optimization
  - 5.5 L'Hopital's Rule
- **Integration (2 weeks)**
  - 5.10 Antiderivatives
  - 6.1 The Definite Integral
  - 6.2 The Fundamental Theorem of Calculus
  - 6.3 Applications of Integration
- **Applications of the Integral (1+ week)**
  - 7.1 The Substitution Rule
  - 7.2 Integration by Parts and Practicing Integration
  - 7.3 Rational Functions and Partial Fractions