

Weekly Schedule for Math 131: Mathematical Concepts – Calculus

Textbook: *Single Variable Calculus: Concepts & Contexts*, 4th edition, Stewart (2010)

Guidelines:

* Proofs, as well as overly complex limits, derivatives, and integrals, are beyond the scope of this course.

* Keep most theorems at an intuitive level.

* Many topics such as special limits of trig functions, limits of inverse trig functions, parametric curves, logarithmic differentiation, and curve sketching for trig functions can be considered optional.

* This is a fall or spring schedule. In the summer, this schedule is accelerated by a factor of 3 to accommodate a 5-week session.

- **Week 1** **1.1, 1.2** (emphasize function classes)
Functions, Models

- **Week 2** **1.3, 1.5, 1.6**
Transformations of Functions, Exponential Functions, Inverses and Logarithmic Functions

- **Week 3** **2.1, 2.2, 2.3** (excluding Squeeze Theorem)
Approximating Slopes of Tangent Lines, Introduction to Limits, Calculating Limits

- **Week 4** **2.4** (excluding limits of inverse trig functions and Intermediate Value Theorem), **2.5**
Continuity, Limits Involving Infinity

- **Week 5** **Review, Exam I, 2.6**
Derivatives and Rates of Change

- **Week 6** **2.7, 2.8, 3.1**
Limit Definition of Derivatives, Slope Graphs and Antiderivatives, Derivatives of Polynomials and Exponential Functions

- **Week 7** **3.2, 3.3, 3.4** (de-emphasize special limits of trig functions to prove derivative formulas)
Product and Quotient Rules, Derivatives of Trig Functions, Chain Rule

- **Week 8** **3.6** (excluding tangents to parametric curves and proving the chain rule), **3.7** (excluding logarithmic differentiation), **3.8**
Derivatives of Log Functions, Linear Approximations,
Applications in Natural and Social Sciences
Note: Spring Break falls between weeks 8 and 9.

- **Week 9** **Review, Exam II, 4.2**
Local and Absolute Extrema
- **Week 10** **4.3, 4.6** (excluding trig optimization)
Curve Sketching, Optimization
- **Week 11** **4.9** (excluding inverse trig functions), **5.1, 5.2** (excluding evaluating an integral by computing the limit of a Riemann sum)
Antiderivatives, Approximating Area, The Definite Integral
- **Week 12** **5.3, 5.4, 5.5**
Evaluating Definite Integrals, Fundamental Theorem of Calculus, Substitution
- **Week 13** **Review, Exam III, 6.1** (excluding parametric curves)
Area Between Curves
Note: Thanksgiving falls during this week.
- **Week 14** **6.5, 6.7** (blood flow and cardiac output), **7.1*** (emphasize population growth)
Average Value of Functions, Applications to Biology, Introduction to Differential Equations
- **Week 15** **Review for Final Exam**

* *as time permits*