

UCLA Math 131A: Analysis

Lecture, three hours; discussion, one hour.

Requisites: courses 32B, 33B. Recommended: course 115A.

Rigorous introduction to foundations of real analysis; real numbers, point set topology in Euclidean space, functions, continuity.

Course Information:

Math 131AB is the core undergraduate course sequence in mathematical analysis. The aim of the course is to cover the basics of calculus, rigorously. Along with Math 115A, this is the main course in which students learn to write logically clear and correct arguments.

There is an honors sequence Math 131AH-131BH running parallel to 131A-131B in fall and winter. 131AH: Rigorous treatment of the foundations of real analysis, including construction of the rationals and reals; metric space topology, including compactness and its consequences; numerical sequences and series; continuity, including connections with compactness; rigorous treatment of the main theorems of differential calculus. 131BH: The Riemann integral; sequences and series of functions; power series, and functions defined by them; differential calculus of several variables, including the implicit and inverse function theorems.

Math 131C is a special topics analysis course offered in the spring that is designed for students completing the honors sequence as well as the regular 131AB sequence. It traditionally covers Lebesgue measure and integration. Math 131A is offered each term, while 131B is offered only Winter and Spring.

Textbook(s)

K.A. Ross, Elementary Analysis: The Theory of Calculus, 2nd Ed.

SECTION	TOPICS
1,2	Induction and Rational Numbers.
3,4,5	Real Numbers, Least Upper Bound Axiom
7,8,9	Limits of Sequences, Limit Theorems.
10	Monotone Sequences, Cauchy Sequences, Midterm I.

SECTION	ΤΟΡΙCS
11,12	Subsequences, Bolzano-Weierstrass, Limsup and Liminf.
14(*1),15,17	Convergence Tests, Continuous Functions.
18,19,20	Limit Theorems, Uniform Continuity.
28,29	Derivative, Mean Value Theorem, Midterm II.
31,32,33	Taylor's Theorem, Riemann Integral, Properties of Riemann Integral.
34	Fundamental Theorem of Calculus, Review of Course.