MATH 151A
Foundations of Real Analysis I

Course Description
Rigorous development of mathematical analysis I. Topics include the formal theory of the real numbers, convergent sequences, monotone sequences, subsequences, convergence tests, limit superior, limit inferior, Bolzano-Weierstrass theorem, Cauchy sequences, limit of functions, continuous functions, extreme value theorems, intermediate value theorems, uniform continuity, and continuity of monotone functions.

Prerequisites
MATH 009C, MATH 010B with a grade of C- or better; or equivalent; or consent of instructor.

Textbook
Basic Analysis I, Introduction to Real Analysis, Volume I (Version 6.0, 2023) by Jiri Lebl
ISBN-10: 1718862407

Additional Resources
An Introduction to Analysis (4th edition, 2009) by Williams R. Wade
ISBN-10: 0132296381

Principles of Mathematical Analysis (3rd edition) by Walter Rudin
ISBN-10: 0070856133

Suggested Lecture Schedule

Week #	Textbook Section(s)	Topic(s)
1	0.3.1, 0.3.2, 0.3.3	Sets, induction, functions
2	0.3.4	Relations, equivalence classes, and cardinality
3	1.1, 1.2	Ordered fields and properties, supremum, infimum, least upper bound property, real numbers, Archimedean property
4	1.3, 1.4	Complex numbers, absolute value, bounded functions, uncountability of the real numbers
5	2.1, 2.2	Convergent sequences, monotone sequences, subsequences, properties of limits
6	2.2	Convergence tests
7	2.3, 2.4	Limit superior, limit inferior, Bolzano-Weierstrass theorem, Cauchy sequences
8	3.1, 3.2	Limit of functions, properties of the limit, continuous functions
9	3.3, 3.4	Extreme value theorems, intermediate value theorems, uniform continuity
10	3.5, 3.6	Lipschitz functions, limits at infinity, continuity of monotone functions