MATH 151B
Foundations of Real Analysis II

Course Description
Rigorous development of mathematical analysis II. Topics include the derivative, mean value and intermediate value theorems, Taylor's Theorem, inverse function theorem, Riemann integrable functions, fundamental theorem of calculus, series, sequences of functions, pointwise and uniform convergence, continuity, integrals, and derivative of the limit.

Prerequisites
MATH 151A 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	4.1, 4.2	Derivative, properties of the derivative, mean value theorem and applications
2	4.2	Continuity of the derivative, Intermediate value theorem
3	4.3, 4.4	Taylor polynomials, Taylor's theorem, Inverse function theorem
4	5.1, 5.2	Darboux sums, Riemann integrable functions, properties of the integral, linearity and monotonicity
5	5.3, 5.4	Fundamental theorem of calculus, change of variables, the logarithm and the exponential
6	2.5	Series, Cauchy series, absolute convergence
7	2.6	Convergence tests, alternating series, rearrangements, multiplication of series
8	2.6 (Lebl), 6.5 (Wade), 6.6 (Wade)	Power series, estimation of series, additional tests
9	6.1, 6.2	Pointwise and uniform convergence, uniform norm, continuity of the limit, integral of the limit
10	6.2 (Lebl), 7.3 (Wade)	Derivative of the limit, examples of sequences of functions, Fourier series, convergence of power series and their properties