

MATH 312 Sections 1 & 2 Concepts of Real Analysis Fall 2023 Schedule

Lec.	Date	Section	Topic
1	8/21	2, 3	Introduction. Rational numbers. Ordered fields.
2	8/23	3, 4	Absolute value. Maximum and minimum. Upper and lower bounds.
3	8/25	4	Supremum and infimum. Completeness Axiom.
4	8/28	4, 5	<b>Quiz 1.</b> Archimedean property. Denseness of $\mathbb{Q}$ in $\mathbb{R}$ . Symbols $\infty$ and $-\infty$ .
5	8/30	7, 8	Sequences. Limits of sequences. Definition and examples.
6	9/1	7, 8, 9	Uniqueness of the limit. Diverging sequences. Bounded sequences.
-	9/4		<i>Labor Day - no classes.</i>
7	9/6	9	<b>Quiz 2.</b> Limit theorems for sequences: constant multiple, sum, product.
8	9/8	9	Limit of a quotient. Squeeze Lemma (Ex. 8.5). Binomial Theorem (Ex. 1.12).
9	9/11	9	<b>Quiz 3.</b> Basis examples. Sequences diverging to $\infty$ and $-\infty$ .
10	9/13		<b>Team Worksheet 1.</b>
11	9/15	10	Monotone sequences.
12	9/18	10	<b>Quiz 4.</b> $\liminf$ and $\limsup$ .
13	9/20	10	Cauchy sequences.
14	9/22	11	Subsequences. Bolzano - Weierstrass Theorem.
15	9/25	11	<b>Quiz 5.</b> Limits of subsequences.
16	9/27		<b>Team Worksheet 2.</b>
17	9/29		Review
18	10/2		<b>Exam 1: Real numbers and sequences.</b>
19	10/4	14	Series: definitions and examples. Decimals.
20	10/6	14	Cauchy Criterion. Absolute convergence. Comparison Test.
21	10/9	14	<b>Quiz 6.</b> Root Test and Ratio Test.
22	10/11	23, 15	Power series. Alternating Series Theorem.
23	10/13		<b>Team Worksheet 3.</b>
24	10/16	17	<b>Quiz 7.</b> Continuous functions. Two definitions of continuity
25	10/18	17	Examples of continuous and discontinuous functions.
26	10/20	17	Continuity of $kf$ , $ f $ , $f + g$ , $fg$ , $f/g$ , and $g \circ f$ .
27	10/23	18	<b>Quiz 8.</b> Properties of continuous functions.
28	10/25	19	Uniform continuity.
29	10/27	20	Limits of functions. ( <i>Notes.</i> )
30	10/30		<b>Quiz 9.</b> More on limits and continuity. ( <i>Notes.</i> )
31	11/1		<b>Team Worksheet 4.</b>
32	11/3		Review.
33	11/6		<b>Exam 2: Series and continuous functions.</b>
34	11/8	28	Derivative: definition and examples. Continuity and differentiability.
35	11/10	28	Sum, product, quotient, and chain rules.
36	11/13	29	<b>Quiz 10.</b> Zeros of the derivative. Mean Value Theorem.
37	11/15	29, 18	Corollaries of the MVT. Inverse function and its derivative.
38	11/17		
	11/19-25		<i>Thanksgiving break - no classes</i>
39	11/27		<b>Quiz 11.</b>
40	11/29		
41	12/1		
42	12/4		<b>Quiz 12.</b>
43	12/6		<b>Team Worksheet 5.</b>
44	12/8		Review

**Final Exam:** Thursday, December 14, 8:00-9:50 a.m. in 135 Reber Building.