MATH 312 Concepts of Real Analysis Spring 2025 Schedule

Lec.	Date	Section	Topic
1	1/13	2, 3	Introduction. Rational numbers. Ordered fields.
2	1/15	3, 4	Absolute value. Maximum and minimum. Upper and lower bounds.
3	1/17	4	Supremum and infimum. Completeness Axiom. Real numbers.
-	1/20	-	*Martin Luther King Day - no classes.*
4	1/22	4, 5	**Quiz 1.** Archimedean property. Denseness of $\mathbb{Q}$ in $\mathbb{R}$. Symbols ∞ and $-\infty$.
5	1/24	7, 8	Sequences. Limits of sequences. Definition and examples.
6	1/27	7, 8	**Quiz 2.** Uniqueness of the limit. Diverging sequences. Bounded sequences.
7	1/29	9	Limit theorems for sequences: constant multiple, sum, product.
8	1/31	9	Limit of a quotient. Squeeze Lemma (Ex. 8.5). Binomial Theorem (Ex. 1.12).
9	2/3	9	**Quiz 3.** Basis examples. Sequences diverging to ∞ and $-\infty$.
10	2/5	10	Monotone sequences.
11	2/7	10	$\liminf$ and $\limsup$.
12	2/10	10	**Quiz 4.** Cauchy sequences.
13	2/12		**Team Quiz 4.5**
14	2/14		Review
15	2/17		**Exam 1.**
16	2/19	11	Subsequences. Bolzano - Weierstrass Theorem
17	2/21	11	Limits of subsequences.
18	2/24	14	**Quiz 5.** Series: definitions and examples.
19	2/26	14	Cauchy Criterion. Absolute convergence. Comparison Test.
20	2/28	14	Root Test and Ratio Test.
21	3/3	23	**Quiz 6.** Power series.
22	3/5	15	Alternating Series Theorem.
23	3/7		Problems on series.
-	3/9 -15	-	*Spring Break – no classes*
24	3/17	17	**Quiz 7.** Continuous functions. Two definitions of continuity
25	3/19	17	Examples of continuous and discontinuous functions.
26	3/21	17	Continuity of kf, $\lvert f\rvert$, $f+g$, fg, f/g, and $g \circ f$.
27	3/24	18	**Quiz 8.** Properties of continuous functions.
28	3/26	19	Uniform continuity.
29	3/28		Review
30	3/31		**Exam 2.**
31	4/2	20	Limits of functions. *(Notes.)*
32	4/4	20	More on limits and continuity. *(Notes.)*
33	4/7	28	Derivative: definition and examples. Continuity and differentiability.
34	4/9	28	Sum, product, quotient, and chain rules.
35	4/11	29	Zeros of the derivative. Mean Value Theorem.
36	4/14	29, 18	**Quiz 9.** Corollaries of the MVT. Inverse function and its derivative.
37	4/16	29	Inverse function (continued). Linear approximation *(Notes.)*
38	4/18		Taylor polynomials *(Notes.)*
39	4/21	32	**Quiz 10.** The Riemann Integral: Darboux construction.
40	4/23	33, 32	Integrable functions. Riemann sums and Riemann integral.
41	4/25	33, 34	Properties of the integral. Fundamental Theorem of Calculus I.
42	4/28	34	**Quiz 11.** Fundamental Theorem of Calculus II.
43	4/30		Review
44	5/2		Review

Final Exam: Wednesday, May 7, 2:30 - 4:20 p.m. in 117 Henderson Bldg.