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	**Quiz 1.** Archimedean property. Denseness of $\mathbb{Q}$ in $\mathbb{R}$. Symbols ∞ 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*		*Labor Day - no classes.*
7	9/6	9	**Quiz 2.** 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	**Quiz 3.** Basis examples. Sequences diverging to ∞ and $-\infty$.
10	9/13		**Team Worksheet 1.**
11	9/15	10	Monotone sequences.
12	9/18	10	**Quiz 4.** Lim inf and lim sup.
13	9/20	10	Cauchy sequences.
14	9/22	11	Subsequences. Bolzano - Weierstrass Theorem.
15	9/25	11	**Quiz 5.** Limits of subsequences.
16	9/27		**Team Worksheet 2.**
17	9/29		Review
18	10/2		**Exam 1: Real numbers and sequences.**
19	10/4	14	Series: definitions and examples. Decimals.
20	10/6	14	Cauchy Criterion. Absolute convergence. Comparison Test.
21	10/9	14	**Quiz 6.** Root Test and Ratio Test.
22	10/11	23, 15	Power series. Alternating Series Theorem.
23	10/13		**Team Worksheet 3.**
24	10/16	17	**Quiz 7.** Continuous functions. Two definitions of continuity
25	10/18	17	Examples of continuous and discontinuous functions.
26	10/20	17	Continuity of kf, $\lvert f\rvert$, $f+g$, fg, f/g, and $g \circ f$.
27	10/23	18	**Quiz 8.** Properties of continuous functions.
28	10/25	19	Uniform continuity.
29	10/27	20	Limits of functions. *(Notes.)*
30	10/30		**Quiz 9.** More on limits and continuity. *(Notes.)*
31	11/1		**Team Worksheet 4.**
32	11/3		Review.
33	11/6		**Exam 2: Series and continuous functions.**
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	**Quiz 10.** Zeros of the derivative. Mean Value Theorem.
37	11/15	29, 18	Corollaries of the MVT. Inverse function and its derivative.
38	11/17		Linear approximation and Taylor polynomials. *(Notes.)*
	11/19-25		*Thanksgiving break – no classes*
39	11/27	32	**Quiz 11.** The Riemann Integral: Darboux construction.
40	11/29	33, 32	Integrable functions. Riemann sums and Riemann integral.
41	12/1	33, 34	Properties of the integral. Fundamental Theorem of Calculus I.
42	12/4	34	**Quiz 12.** Fundamental Theorem of Calculus II.
43	12/6		**Team Worksheet 5.**
44	12/8		Review

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