Math 454 Principles of Real Analysis Fall 2020 Q2

Textbook: Abbott, *Understanding Analysis*, Springer-Verlag, **2e** (2016).

Wk	Date	Section	Problems 2e	Due	Topics
1	M 11/30	1.1 1.2 1.3 1.4 1.5 1.6	- 5, 8, 9 3, 8 1, 3 9 4	F 12/4	**Ch. 1 – Real Numbers** N, Z, Q, R; function, one-to-one, onto; sup, inf, Axiom of Completeness; Q countable, R uncountable, Q dense in R; Cantor's Theorem
	W 12/2	2.1 2.2 2.3	- 1, 2, 7 3, 7, 13a	M 12/7	**Ch. 2 – Sequences and Series**
	F 12/4	2.4 2.5	1, 7 1, 9	W 12/9	Monotone Convergence Theorem Bolzano-Weierstrass Theorem
2	M 12/7	2.6 2.7 2.8 2.9	2, 3 5, 8, 9 1 -	F 12/11	Cauchy sequence Infinite series and convergence tests
	W 12/9		Q&A, hand out exam	**M 12/14**	**Exam 1 – due M 12/14**
	F 12/11	3.1 3.2	- 2, 6, 8, 14	W 12/16	**Ch. 3 – Basic Topology of R,** Cantor Set, Open and closed sets
3	M 12/14	3.3 3.4	1, 2, 11 5, 7, 9ab	F 12/18	Compact sets, Heine-Borel Theorem Perfect, connected
	W 12/16	4.1 4.2 4.3	- 5, 8ab, 9, 11 3, 7, 8	M 12/21	**Ch. 4 – Limits and Continuity** Definition of the limit of a function Continuity
	F 12/18	4.4 4.5 4.6	1, 6, 11 7 -	M 1/4	Compact sets and connected sets under continuous maps, uniform continuity, Intermediate Value Theorem
4	M 12/21		Q&A, hand out exam	**W 1/6**	**Exam 2 – due W 1/6**
	W 12/23 – N 1/3				Holiday Break
5	M 1/4	5.1 5.2 5.3	- 3, 7 1a, 3, 7, 11a	F 1/8	**Ch. 5 – Derivative** Definition, continuity, $g_n(x) = x^n \sin(1/x)$ Darboux's Theorem, Mean Value Theorem
	W 1/6	5.4 5.5	- -	M 1/11	Example: sawtooth function – continuous, nowhere-differentiable
	F 1/8	6.1 6.2 6.3 6.4	- 1, 3, 5 1, 3 3a, 5a	W 1/13	Ch. 6 – Sequences and Series of Functions Pointwise and uniform convergence
6	M 1/11	6.5 6.6 6.7	1, 2, 7, 8a 5 -	F 1/15	Power series Taylor series
	W 1/13		Q&A, hand out exam	**M 1/18**	**Exam 3 – due M 1/18**
	F 1/15	7.1 7.2 7.3 7.4	- 1, 2 1, 3 3	W 1/20	**Ch. 7 – Riemann Integral** Definition of Riemann Integral; U(f), L(f)
11	M 1/18	7.5 7.6 7.7	8ab 1, 3 -	F 1/22	Fundamental Theorem of Calculus measure zero; Lebesgue's Theorem

	W 1/20	8.1		-	**Ch. 8 – Generalized Riemann Integral**
	F 1/22	8.1	hand out Exam 4	-	Tagged partition, gauge, Kurzweil-Henstock Integral
12	M 1/25		office hours	**W 1/27**	**Exam 4 – due W 1/27**
	W 1/27				evaluations