

Math 497.001 Spring 2020 Schedule

Lec.	Date	Topic
1	1/13	An overview: questions and examples.
2	1/15	Contractions in \mathbf{R}
3	1/17	Proof of Contraction Principle. Contractions in \mathbf{R}^k .
-	1/20	- Martin Luther King Day - no classes -
4	1/22	Fibonacci numbers. Weak contractions.
5	1/24	Increasing maps of an interval. Bifurcations.
6	1/27	Attracting fixed points. Newton's method.
7	1/29	Periodic points. Circle rotations. Rational α .
8	1/31	Irrational α : density and uniform distribution of orbits.
9	2/3	First digits of powers.
10	2/5	Times-3 map of the circle.
11	2/7	Times-3 map of the circle. Cantor set.
12	2/10	Shifts on sequences spaces.
13	2/12	Shifts on sequences spaces.
14	2/14	Subshifts of finite type.
15	2/17	Compactness.
16	2/19	Topological transitivity and minimality.
17	2/21	Questions and answers.
18	2/24	Exam 1
19	2/26	Recurrent points. Lebesgue measure -- an overview.
20	2/28	Recurrence theorems.
21	3/2	Billiards in convex regions. Billiard in a disc.
22	3/4	More on billiards. Billiard in a square.
23	3/6	Unfolding. The two-dimensional torus. Linear flows and translations.
	3/8-14	<i>Spring Break - no classes</i>
24	3/16	Linear maps in the plane.
25	3/18	Linear maps in the plane.
26	3/20	Eigenvalues, eigenvectors, and similar matrices.
27	3/23	Topological conjugacy.
28	3/25	Topological conjugacy.

29	3/27	Automorphisms of the torus \mathbf{T}^2 .
30	3/30	Hyperbolic automorphisms of \mathbf{T}^2 .
31	4/1	The number of points of period n .
32	4/3	Topological mixing. Arnold's Cat Map.
33	4/6	Summary. Questions and answers.
34	4/8	Exam 2
35	4/10	Structural stability.
36	4/13	Topological entropy.
37	4/15	Topological entropy.
38	4/17	Products of dynamical systems.
39	4/20	Fractals.
40	4/22	Box dimension and Hausdorff dimension.
41	4/24	Fractals in Complex Dynamics.
42	4/27	Project presentations.
43	4/29	Project presentations.
44	5/1	Project presentations.