Approximate Syllabus for MAT 555
Spring, 2017

Text: **Introduction to Dynamical Systems,** by Brin and Stuck

Jan 24 Examples of dynamical systems Readings: 1.1, 1.2, 1.3 Exercises: *1.2.1, 1.2.4*

Jan 26 Limit sets, Minimal sets, Topological transitivity/Mixing 2.1, 2.2 *2.1.1, 2.1.2, 2.1.5*

Jan 31 Symbolic Dynamics (Shift Spaces) 1.3, 1.4, 3.1 *1.4.4*

Feb 2 Smale's Horseshoe, Coding & Topological conjugacy 1.8 *1.8.3*

Feb 7 Translations and linear flow on n-dimensional torus 1.7 *1.7.1, 1.7.3, 2.2.6*

Feb 9 Subshifts of finite type & Perron-Frobenius Theorem 1.4, 3.2, 3.3 *3.3.1*

Feb 14 Perron-Frobenius & Applications (continued) 3.3, *4.12*

Feb 16 Topological Entropy 2.5

Feb 21 Topological entropy (equivalent definitions) 2.5 *2.5.1, 2.5.7*

Feb 23 Computing h_{top} (subshifts of finite type, etc.) 2.6

Feb 28 The Variational Principle 9.5

Mar 2 Poincaré Recurrence Theorem and applications 4.2 *4.2.1*

Mar 7 Invariant Measures, Krylov-Bogolyubov Theorem 4.1, 4.6 *4.4.5*

Mar 9 Ergodic Measures 4.3, 4.6

Mar 14– 23 No class

Mar 28 Ergodic Theorems. Birkhoff Ergodic Theorem 4.3, 4.5 *4.5.2*

Apr 4 Mixing, Weak Mixing, Ergodicity & Unique Ergodicity 4.3, 4.4 *4.3.3, 4.4.2, 4.4.3*

Apr 6 Applications of Ergodicity to Number Theory. Szemeredi's Theorem 4.11 *4.11.2*

Apr 11 One-dimensional complex dynamics 8.5, 8.6

Apr 13 One-dimensional complex dynamics (II) 8.5, 8.6

Apr 18 Fatou-Bieberbach domains

Apr 20 Hyperbolicity in dimension one

Apr 25 Hyperbolicity in dimension > 1, Invariant cones. 5.2, 5.4

Apr 27 Structural Stability of Hyperbolic maps 5.3, 5.5

May 2 Stable Manifold Theorem 5.6

May 4 – 18 Further topics/ Review