Course Syllabus  
Math 635, Winter 2009

Description: Math 635 is an introduction to the theory of differential equations and dynamical systems.

Class Time: MWF 9:00-9:50pm
Location: 133 TMCB

Prerequisites. MATH 315 (Analysis), MATH 334 (Diff Eqns.). MATH 634

Instructor: Todd Fisher

Contact Information:
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Phone: 2-6153
Office: 348
Office Hours: MWF 3-4

Class Policies

Attendance: Attendance is not mandatory, but is highly encouraged!

Homework: Working exercises is necessary in Mathematics. It is crucial to understanding the material. You are expected to do all the assigned homework. Homework will be turned in on Fridays.

Text: There is no required text for the course. However, I will be using the books *Introduction to Dynamical Systems*, by Brin and Stuck as the main reference for the class. The other texts will be *Dynamical Systems* by Clark Robinson and *Introduction to the Modern Theory of Dynamical Systems* by Katok and Hasselblatt. All of these texts will be on course reserve.

Exams: There will be one midterm and one final exam. The questions will be long answer and partial credit will be given. The midterm will be take home the final will be in class. The final is Saturday, April 18 from 7-10 am in the classroom.

Grading: Here is the correspondence of course grade and percentage of possible points scored: A 90-100%, B 80-89%, C 70-79%, D 60-69%. F 0-59%. It is possible that the curve will be relaxed. Homework will be 50% of the total, the midterm will be 20%, and the final will be 30% of your grade.

Changes: At the beginning of each class I will make necessary announcements about changes in the syllabus, schedule, etc. Make sure that if you arrive late that you get these announcements. Announcements will also be posted on my web page.
**Cheating:** Cheating will not be tolerated and if you are caught cheating in an exam or on an assignment you will receive a failing grade in the course. You are highly encouraged to work on the homework in a group, but you must write up the assignment individually.

**Inclement Weather:** In the case of the class or campus being closed due to weather any assignments or tests for that day will be delayed to the next class period. The class will not be made up.

**Religious Observances:** If you need to miss an assignment due to religious observances you will not be penalized. Please see me to make appropriate accommodations.

**Preventing Sexual Harassment:** Harassment of any kind is inappropriate at BYU. Specifically, BYU's policy against sexual harassment extends not only to employees of the university but to students as well. If you encounter sexual harassment, gender-based discrimination, or any other inappropriate behavior, please talk to your professor, contact the Equal Employment Office at 422-5895 or 367-5689, or contact the Honor Code Office at 422-2847.

**Students with Disabilities:** BYU is committed to providing reasonable accommodations to qualified persons with disabilities. If you have any disability that may adversely affect your success in this course, please contact the University Accessibility Center at 422-2767. Services deemed appropriate will be coordinated with the student and instructor by that office.
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<td>Jan 5: Introduction</td>
<td>Recurrence and factor maps</td>
<td>Circle rotations</td>
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<td>Jan 12: Circle Endomorphisms</td>
<td>Shifts and subshifts</td>
<td><strong>HWK 1: Quadratic maps</strong></td>
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<td>Jan 19: No class</td>
<td>Hyperbolic toral automorphisms</td>
<td><strong>HWK 2: Hyperbolic toral automorphisms</strong></td>
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<td>Jan 26: The horseshoe</td>
<td>The solenoid</td>
<td><strong>HWK 3: Topological transitivity and mixing</strong></td>
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<td>Feb 2: Expansiveness and topological entropy</td>
<td>Topological entropy</td>
<td><strong>HWK 4: Computing topological entropy</strong></td>
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<td>Feb 9: Computing topological entropy</td>
<td>Measure theory and recurrence</td>
<td><strong>HWK 5: Ergodicity and mixing</strong></td>
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<td><strong>Feb 17: Examples and ergodic theorems</strong></td>
<td>Ergodic theorems</td>
<td><strong>HWK 6: Measures on metric spaces</strong></td>
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<td>Feb 23: Measures on metric spaces</td>
<td>Invariant measures</td>
<td><strong>HWK 7: Differential topology; Handout midterm</strong></td>
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<td>Mar 2: Differential topology</td>
<td>Hyperbolic sets</td>
<td><strong>Collect midterm:</strong> Hartman-Grobman</td>
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<td>Mar 9: Hartman-Grobman</td>
<td>Hartman-Grobman</td>
<td><strong>HWK 8: Inclination lemma</strong></td>
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<td>Mar 16: Horseshoes</td>
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<td><strong>HWK 9: Anosov</strong></td>
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<td>Mar 23</td>
<td>Stability of hyperbolic sets</td>
<td>Closing lemma</td>
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<td>Local product structure</td>
<td><strong>HWK 10</strong>: Spectral decomposition</td>
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<td>Mar 30</td>
<td>Axiom A spectral decomposition</td>
<td><strong>HWK 11</strong>: Markov partitions</td>
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<td>Apr 6</td>
<td>Markov partitions</td>
<td><strong>HWK 12</strong>: Sharkovsky’s Theorem</td>
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<td>Apr 13</td>
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<td>Reading Day</td>
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