

Math 676 * Fall 2014 * Victor Matveev

Course Outline			
Lecture	Sections	Topic	H/W
1 (9/4)	1.1-1.7	Review: 1D Flows; 2D Phase Space and Nullclines	p. 23
2 (9/8)	2.1-2.3	Review: Linear Systems and Diagonalization	p. 67
3 (9/11)	2.4-2.6	Review: Fundamental Solution Theorem for Linear Systems	p. 67
4 (9/15)	2.7	Linear Systems: Stability	p. 67
5 (9/18)	2.8	Non-autonomous Systems and Floquet Theory	p.67
6 (9/22)	3.1-3.3	Existence and Uniqueness Theorem	p. 101
7 (9/25)	3.4-3.5	Dependence on Parameters; Maximal Interval of Existence	p. 101
8 (9/29)	4.1-4.4	Flows, Global Existence, Linearization	p. 159
9 (10/2)	4.5-4.6	Stability; Lyapunov Functions and Hamiltonian Systems	p. 159
10 (10/6)	4.7-4.8	Topological Equivalence; Hartman-Grobman Theorem	p. 159
11 (10/9)	4.9-4.10	Limit Sets, Attractors & Basins	p. 159
12 (10/13)	4.11-4.12	Stability of Periodic Orbits; Poincare Maps	p. 159
13 (10/16)		Review for Midterm Exam	
14 (10/20)		Midterm Exam	
15 (10/23)	5.1-5.3	Stable and Unstable Manifolds; Heteroclinic Orbits	p. 192
16 (10/27)	5.4	Local Stable Manifold Theorem	p. 192
17 (10/30)	5.5-5.6	Global Stable Manifolds and Center Manifolds	p. 192
18 (11/3)	6.1-6.4	Nonhyperbolic Equilibria & Nodes; Centers; Symmetries & Reversors	p. 238
19 (11/6)	6.5-6.6	Index Theory; Poincare-Bendixson theorem	p. 238
20 (11/10)	6.7-6.8	Lienard Systems; Behavior at Infinity	p. 238
21 (11/13)	7.1-7.3	Chaos: Lyapunov Exponents, Strange Attractors; Hausdorff Dimension	p. 265
22 (11/17)	8.1-8.2	Bifurcations of Equilibria	p. 325
23 (11/20)	8.3-8.4	Unfolding Vector Fields; Saddle-Node Bifurcation in 1D	p. 325
24 (11/24)	8.5	Normal Forms	p. 325
25 (11/25)	8.6-8.7	Saddle-Node Bifurcation in \mathbf{R}^n ; Degenerate Saddle-Node Bifurcation	p. 325
26 (12/1)	8.8-8.9	Andronov-Hopf Bifurcation; the Cusp Bifurcation	p. 325
27 (12/4)	8.10-8.11	Takens-Bogdanov Bifurcation; Homoclinic Bifurcations	p. 325
28 (12/8)		Review for Final Exam	

Grading Policy

Assignment Weighting	
HW	30 %
Midterm exam	30 %
Final Exam	40 %

Tentative Grading Scale	
A	88 -- 100
B+	82 -- 87
B	75 -- 81
C+	68 -- 74
C	60 -- 67
F	Below 60

Course Policies

- **Email:** it is important that you regularly check your NJIT email account for class assignments and announcements from your instructor. Rutgers students should email the instructor their preferred email address at the start of the semester.
- **Homework and Quizzes:** Homework problem sets will be emailed by the instructor once a week. Homework is due on the assigned date; late homework is not accepted.