EEE8058 Nonlinear Systems

Fall 2018

Lectures: Wednesday 09:30-12:20, MC270

Course web: http://www.onurcihan.com/

Instructor: Dr. Onur Cihan

Office hours: Tuesday 15:30-16:30, Wednesday 15:30-16:30

Course outline: Introduction, One dimensional flows: flows on the line, bifurcations, flows on the circle, Two dimensional flows: Linear systems, phase plane, limit cycles, bifurcations revisited.

Textbook: Steven H. Strogatz, Nonlinear Dynamics And Chaos: With Applications To Physics, Biology, Chemistry, And Engineering, 1st edition, CRC Press.

Honor code: All work done on the exams will be done on your own and pledged. Homework concepts and approaches may be discussed with other students, but the work will be done by the individual.

Attendance: At least 70% attendance is required.

Homework: Normally, homework is due one week from the assigned date, and will be collected at the beginning of the class. No late homework.

Grading:

Midterm Exam:	20%
Homework:	20%
Project:	10%
Final Exam:	50%

Tentative weekly course plan:

Week 1:	Introduction
Week 2:	One dimensional flows: flows on the line
Week 3:	One dimensional flows: bifurcations
Week 4:	One dimensional flows: flows on the circle
Week 5:	Two dimensional flows: linear systems
Week 6:	Two dimensional flows: phase plane
Week 7:	Two dimensional flows: index theory
Week 8:	Two dimensional flows: limit cycles
Week 9:	Two dimensional flows: ruling out closed orbits
Week 10:	Two dimensional flows: Poincaré-Bendixson theorem
Week 11:	Two dimensional flows: relaxation oscillations
Week 12:	Two dimensional flows: weakly nonlinear oscillators
Week 13:	Bifurcations revisited
Week 14:	Project presentations