

APMA 2190 – Nonlinear Dynamical Systems

Fall semester, 2017

Instructor:

Anastasios Matzavinou

Office:

Room 325, 182 George Street

Class meeting times:

Tu & Th 2:30 pm – 3:50 pm, Sayles Hall 204

Office hours:

Tu & Th 4:10pm – 5:00pm
(or by appointment)

Class web page:

<https://canvas.brown.edu/courses/1074051>

Announcements and other information about the class will be posted regularly on the class web page.

Course description:

Topics covered include basic existence and uniqueness results for ordinary differential equations, linear systems and Floquet theory, hyperbolicity, topological conjugacies, the Grobman-Hartman theorem, stable and unstable manifold theorems, planar systems and the Poincaré-Bendixson theorem, center manifolds, bifurcation theory, and Hamiltonian systems.

Occasionally we may also discuss various generalizations to infinite-dimensional dynamics and applications to partial differential equations.

Useful references:

Although there is no required text, the following, among others, may be useful in parts of the course:

- Luis Barreira and Claudia Valls, *Ordinary differential equations: Qualitative theory*, AMS
- Carmen Chicone, *Ordinary differential equations with applications*, Springer
- Philip Hartman, *Ordinary differential equations*, 2nd Edition, SIAM
- Herbert Amann, *Ordinary differential equations*, De Gruyter

The textbook by Barreira and Valls, in particular, contains most of the material covered in this course.

Grading policy – The final grade will be based on homework assignments and a take-home final exam:

Homework assignments	60%
Final exam	40%

Homework assignments – Homework problems will be handed out on a regular basis. Discussion of homework assignments with other students is encouraged, but what is handed in should be your own work.

Accommodations and other considerations:

Brown University is committed to full inclusion of all students. Please inform me early in the term if you have a disability or other conditions that might require accommodations or modification of any of these course procedures. You may speak with me after class or during office hours. For more information, please contact Student and Employee Accessibility Services at 401-863-9588 or SEAS@brown.edu.

Students in need of short-term academic advice or support can contact one of the deans in the Dean of the College office.