

MATH 6324, DIFFERENTIAL EQUATIONS

Course times: Lecture times are as follows:

- Tuesday & Thursday 11.30am-1pm, SEC-202

Office hours: 2 hours a week at times to be determined at first class meeting or by appointment.

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Course Description: This course is an introduction to differential equations. We cover linear theory: existence and uniqueness for autonomous and non-autonomous equations; stability analysis; stable and unstable manifolds; floquet theory and elementary bifurcation theory. We will also cover topics such as quasiperiodic motion; normal form theory; perturbation theory and classical mechanics.

Recommended Texts:

- Differential Equations, Dynamical Systems and Linear Algebra by M. Hirsch and S. Smale (available at Amazon or in the library)
- Ordinary Differential Equations by V. I. Arnold, M.I.T press, 1998 (paperback)
- Geometrical Methods in the Theory of Ordinary Differential Equations by V. I. Arnold, Springer Verlag, 2nd Edition 1988.
- Nonlinear Oscillations, Dynamical Systems and Bifurcations of Vector Fields by J. Guckenheimer and P. Holmes (Applied Mathematical Sciences Vol 42) Springer Verlag.
- Mathematical Methods of Classical Mechanics by V. I. Arnold, Springer Verlag, 2nd Edition.

It is not necessary to buy anything of the references, though Ordinary Differential Equations by V. I. Arnold and Differential Equations, Dynamical Systems and Linear Algebra by M. Hirsch and S. Smale would be most useful to own. The books are useful for reference and lecture notes will be based on these texts and a variety of sources.

Assessment: There will be one midterm (worth 20 points), a final exam (30 points) as well as 2 to 4 take-home problem sheets (to make up 50 points in total).