

## Syllabus

**Instructor:** Dr. F. X. Tanner

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**Lectures:** MWF 04:05–04:55, 327B Fisher Hall

**Office Hours:** MWF 03:05–03:55 pm and by appointment

**Prerequisites:** Introductory course in linear algebra, elementary differential equations and multi-variable calculus, or consent of instructor.

**Textbook:** Steven H. Strogatz, *Nonlinear Dynamics and Chaos*, Perseus Books, Reading Massachusetts, 1994.

**Contents:** Topics covered include:

Ordinary differential equations and dynamical systems via a modern geometric approach including topics such as phase planes, limit cycles, bifurcations, Lorenz equations, fractals, strange attractors.

**Computing:** Access to one of the computing environments such as Matlab, MathCad, Mathematica, Maple etc. is required in order to do some of the homework assignments.

**Course Grade:** The course grade will be based on periodically assigned homework (50%) and a final exam (50%).

The scale is the straight percentage scale:

$A \geq 90\%$ ,  $AB \geq 85\%$ ,  $B \geq 80\%$ ,  $BC \geq 75\%$ ,  $C \geq 70\%$ ,  $CD \geq 65\%$ ,  $D \geq 60\%$ ,  $F < 60\%$

### Additional References:

- M. W. Hirsch, S. Smale and R. L. Devaney, *Differential Equations, Dynamical Systems, & An Introduction to Chaos*, Second Edition, Elsevier Academic Press, 2004.
- J. M. T. Thompson and H. B. Stewart, *Nonlinear Dynamics and Chaos*, 2nd Ed., Wiley, West Sussex, UK, 2002.
- Denny Gulick, *Encounters with Chaos*, McGraw-Hill, New York 1992.
- Robert L. Devaney, *An Introduction to Chaotic Dynamical Systems*, 2nd Ed., Addison-Wesley, 1989.
- V.I. Arnold, *Ordinary Differential Equations*, MIT Press, Cambridge, Massachusetts, 1981.
- Carl D. Meyer, *Matrix Analysis and Applied Linear Algebra*, SIAM, Philadelphia, 2000.
- Gilbert Strang, *Linear Algebra and Its Applications*, third edition, International Thomson Publishing, 1988.

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