## Ordinary Differential Equations MATH 465 Spring 2012

Text: Nonlinear Dynamics and Chaos by Steven Strogatz

The topics covered in the course will include:

- 1. Nonlinear models arising in Biology, Mechanics and other Earth Sciences
- 2. Steady states, bifurcation and oscillations
- 3. Discrete dynamics; mappings and difference equations
- 4. Multi-dimensional flows and linear systems
- 5. Local and global stability
- 6. Phase portraits, stability and limit cycles
- 7. Dissipative systems, reversible systems
- 8. Poincare maps, Hopf bifurcations and higher bifurcations
- 9. One dimensional maps and Lyapunov exponents
- 10. Chaotic oscillations, strange attractors and fractals
- 11. Periodic mapping systems

**Professor**: Robert Sacker

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**Course web page:** http://www-bcf.usc.edu/~rsacker/M465.html **Course credit:** 4 units

Grader:	TBA
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Midterm Exam 1:	Wednesday	February 20	
Midterm Exam 2:	Wednesday	April 3	
Final	Wednesday	May 8	2:00 - 4:00

Last day to drop without "W": Last day to drop with "W": February 1 April 12

## **GRADING POLICY**

2 Midterm exams – 40% of grade Homework – 35% Final – 25%

## Class Schedule

Week	Starting	Sections covered
1	January 14	2.1 – 2.4
2	January 21	2.6, 2.7, 3.0 – 3.2 (Martin Luther King day)
3	January 28	3.3 – 3.5, 5.0, 5.1
4	February 4	5.2, 5.3, 6.0 – 6.2
5	February 11	6.3 - 6.6
6	February 18	(President's Day) 6.7, 6.8 (Midterm)
7	February 25	7.0 – 7.2
8	March 4	7.3 – 7.6
9	March 11	8.0 - 8.3
10	March 18	(Spring Recess)
11	March 25	8.4 - 8.7
12	April 1	9.0 – 9.3
13	April 8	9.4 – 9.6, 10.0, 10.1 (Midterm)
14	April 15	10.2 – 10.6
15	April 22	11.0 – 11.2
16	April 29	11.3 – 11.5
17	May 3	(Last day) Review