

**MATH 480: Applied Differential Equations**  
**Fall 2017**

**Lecture time & location:** M/W/F 9:00-9:50am in 311 AH.

**Instructor:**

Mimi Dai  
Office: 516 SEO  
Office hours: M/W 2:00-3:00pm  
Email: mdai@uic.edu.

**Textbook:**

- Required: “*Ordinary Differential Equations*” by M. Tenenbaum and H. Pollard.
- Supplementary textbook: “*Ordinary Differential Equations and Dynamical Systems*” by G. Teschl, available for free from the author’s webpage: <http://www.mat.univie.ac.at/gerald/ftp/book-ode>.

**Grading Policy:** The total score for this course will be computed as follows:

Homework:	20%
Midterm Exam:	30%
Final Exam:	50%

**Tentative Topics and Schedule:**

- Week 1: Separable equations, first order equations with homogeneous coefficients, equations with linear coefficients, exact equations (Lesson 6–8);
- Week 2: Linear equations of the first order, homogeneous equations of higher order with constant coefficients (Lesson 9, Lesson 11, Lesson 20);
- Week 3: Non-homogeneous equations of higher order with constant coefficients (Lesson 21);
- Week 4: Variation of parameters (Lesson 22);
- Week 5: Reduction of order (Lesson 23);
- Week 6: Series solutions of linear equations, singular points, solution about a regular singular point (Lesson 37, Lesson 40);
- Week 7: Boundary value problems, Sturm-Liouville problem (Teschl);
- Week 8: **Review and First Midterm Exam**, it covers L6-23, L37, L40;
- Week 9: Systems of linear equations (Lesson 31);
- Week 10: Linearization of first order systems (L32);
- Week 11: Fixed points and stability (Teschl);
- Week 12: Nonlinear stability, Liapunov function, conservative fields (Teschl);
- Week 13: Picard iterations, contraction mappings (L57);
- Week 14: Existence and uniqueness (L58) (Thanksgiving holiday);
- Week 15: **Review and preparation for final exam.**

**Homework: One problem will be graded for each assignment**

Lesson 6: 8, 10, 16, 20

Lesson 7: 8, 10, 14

Lesson 8: 2, 5, 12

Lesson 9: 9, 13, 16

Lesson 11: 4, 14, 18, 22

**Above HW Due Friday Week 3**

Lesson 20: 6, 8, 20, 28, 33

Lesson 21: 4, 6, 8, 11, 18, 20, 24, 26, 30

Lesson 22: 5, 7, 9, 12, 17, 19

**Above HW Due Friday Week 6**

Lesson 23: 4, 6, 9, 11, 16, 20

Lesson 37: 1 a, 2, 4, 6, 10, 11

**Above HW Due Friday Week 9**

Lesson 40: 1b, 1c, 3, 6, 8\*

Lesson 31: 2, 6, 10, 12, 14, 15, 18, 21, 23, 25,

**Above HW Due Friday Week 12**

Lesson 32: 1, 4, 6, 8

Lesson 57: 3, 5, 7

Lesson 58: 6\*

**Above HW Due Friday Week 15**