# Course Information

**Course #:** MATH 202  
**Title:** Elements of Differential Equations  
**Textbook:** A First Course in Differential Equations by D.G. Zill, 10th Edition

## Course Syllabus

**Coordinator:** Dr. Abdul Rahim Khan  
**Semester:** Semester I: 2013-2014

### Week 1: Sep 1-5
- **Sec. 1.1:** Definitions and Terminology  
- **Sec. 1.2:** Initial-Value Problems  
- **Topics:** Initial-Value Problems  
- **Suggested Homework Problems:** 5, 13, 14, 18, 20, 22, 29, 32, 36, 38

### Week 2: Sep 8-12
- **Sec. 2.2:** Separable Variables  
- **Sec. 2.3:** Linear Equations  
- **Topics:** Linear Equations  
- **Suggested Homework Problems:** 6, 10, 12, 21, 26, 30, 32, 48

### Week 3: Sep 15-19
- **Sec. 2.4:** Exact Equations  
- **Sec. 2.5:** Solutions by Substitutions  
- **Topics:** Exact Equations  
- **Suggested Homework Problems:** 5, 8, 12, 20, 28, 30, 31, 34, 42(b), 43

### Week 4: Sep 22-26
- **Sec. 3.1:** Linear Models: Growth and Decay  
- **Sec. 4.1:** Basic Theory  
- **Topics:** Linear Equations  
- **Suggested Homework Problems:** 4, 8, 10, 15, 16, 18, 20

### Week 5: Sep 29-Oct 3
- **Sec. 4.1.1:** Initial-Value and Boundary-Value Problems  
- **Sec. 4.1.2:** Homogeneous Equations  
- **Topics:** Initial-Value and Boundary-Value Problems  
- **Suggested Homework Problems:** 2, 4, 6, 10, 12, 13(c), 14, 16, 22, 25, 28, 30

### Week 6: Oct 6-9
- **Sec. 4.1.3:** Nonhomogeneous Equations  
- **Sec. 4.2:** Reduction of Order  
- **Topics:** Nonhomogeneous Equations  
- **Suggested Homework Problems:** 31, 34, 36(b,c), 46, 10, 13, 16, 18, 19

### Week 7: Oct 21-24
- **Sec. 4.3:** Homogeneous Linear Equations with Constant Coefficients  
- **Sec. 4.5:** Undetermined Coefficients – Annihilator Approach  
- **Topics:** Homogeneous Linear Equations with Constant Coefficients  
- **Suggested Homework Problems:** 5, 8, 12, 14, 18, 22, 28, 32, 36, 42, 49, 50

### Week 8: Oct 27-31
- **Sec. 4.6:** Variation of Parameters  
- **Topics:** Variation of Parameters  
- **Suggested Homework Problems:** 2, 6, 11, 12, 18, 22, 24, 26, 28

### Week 9: Nov 3-7
- **Sec. 4.7:** Cauchy-Euler Equation (Both Methods)  
- **Topics:** Cauchy-Euler Equation (Both Methods)  
- **Suggested Homework Problems:** 1, 6, 8, 12, 16, 18, 22, 24, 29, 32, 36, 38, 40

### Week 10: Nov 10-14
- **Sec. 6.1:** Review of Power Series  
- **Sec. 6.2:** Solutions About Ordinary Points  
- **Topics:** Review of Power Series  
- **Suggested Homework Problems:** 2, 3, 4, 8, 10, 12, 16

### Week 11: Nov 17-21
- **Sec. 6.3:** Solutions about Singular Points  
- **App II:** Matrices and Linear Systems (Review)  
- **Topics:** Matrices and Linear Systems (Review)  
- **Suggested Homework Problems:** 1, 4, 8, 12, 14, 16, 19, 24, 30, 32

### Second Exam: Wednesday, November 27, 2013, 8.00 P.M. (100 points) Material: 4.1 – 4.7

### Week 12: Nov 24-28
- **App II:** The Eigenvalue Problem  
- **8.1:** Preliminary Theory—Linear Systems  
- **Topics:** The Eigenvalue Problem  
- **Suggested Homework Problems:** 48, 49, 53, 54, 56, 59, 60, 61

### Week 13: Dec 1-5
- **Sec. 8.2:** Homogeneous Linear Systems  
- **8.2.1:** Distinct Real Eigenvalues  
- **8.2.2:** Repeated Eigenvalues  
- **Topics:** Homogeneous Linear Systems  
- **Suggested Homework Problems:** 2, 7, 9, 10, 14, 22, 24, 26, 27, 29, 30

### Week 14: Dec 8-12
- **Sec. 8.2.3:** Complex Eigenvalues  
- **8.3:** Nonhomogeneous Linear Systems  
- **Topics:** Nonhomogeneous Linear Systems  
- **Suggested Homework Problems:** 34, 37, 38, 42, 46

### Week 15: Dec 15-19
- **8.3.2:** Variation of Parameters  
- **8.4:** Matrix Exponential (No Laplace Transform)  
- **Topics:** Matrix Exponential (No Laplace Transform)  
- **Suggested Homework Problems:** 12, 14, 15, 28, 30, 31

### Week 16: Dec 22-24
- **Sec. 8.4:** Pace Adjustment and Review  
- **Topics:** Pace Adjustment and Review  
- **Suggested Homework Problems:** 2, 5, 6, 8, 9, 10, 12

### Final Exam: To be announced later (140 points) [Comprehensive]

- For remarks about Homework Problems and Exams, see the following page.
Remarks and Policies

**Homework:**

- The selected homework problems indicate the levels of the breadth and the depth of coverage. To acquire proficiency on solution methods, the students are strongly urged to solve much more problems than indicated in the syllabus.

- In Sec. 8.4, problems 1, 5 and 9 refer to the same matrix. The same is true for problems 2 and 6 and problems 4 and 8. The matrix \( e^{At} \) is to be computed by the definition given in (3). The material about Laplace Transform on page 358 is omitted.

**Review Material:** In the introduction of each section in the textbook, review material, if any, is indicated. Student must do all reviews. Students should make a plan, based on the Syllabus, for all the reviews required for the course.

**Exams:**

- Any student missing a major exam with or without excuse will not be given a Make-Up Exam. However, a student missing an Exam with an official excuse from the “Deanship of Students Affairs” will be compensated according to the following policy.

  - **Exam Missed by the Student:** Grade to be compensated := ExM, Ave of Exam: AveM
  - **Exam taken by Student:** Grade obtained = ExT, Ave of Exam: Ave T
  - **Final Exam:** Grade obtained:= ExF, Ave of Exam: Ave F
  
  \[
  \text{ExM} = \text{AveM} + \frac{[10(\text{ExT}-\text{AveT})+14(\text{ExT}-\text{AveF})]}{24}
  \]

- **Class Work (60 Points = 15%):** The policy on the class work will be determined by your course instructor and will be announced during the first week of the semester.

**Attendance:**

- Attendance is compulsory. KFUPM policy with respect to attendance will be strictly enforced.
- Any student accumulating 9 unexcused absences will be awarded DN Grade in the course.

*****Best Wishes for a Pleasant Semester*****