

MAT 219: Introduction to Differential Equations (Spring 2015)

Frequency: Fall/Spring Terms

Credit: 4

Course Coordinator: İbrahim Ünal

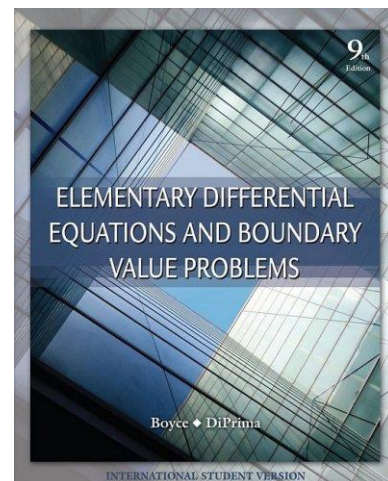
(office: R-134, phone: x2916, email: uibrahim@metu.edu.tr)

Course Website: <http://math.ncc.metu.edu.tr/math219>

Contains the full course information. Check it!

We will also be using the new **ODTUClass** system.

Textbook: *Elementary Differential Equations and Boundary Value Problems*, Boyce, W. E., DiPrima, R. C., 9th ed.



Exams and Grading: Course grades are determined by one (non-cumulative) midterm exam, three short exams and a cumulative final exam as well as a small amount of bonus.

- **Midterm Exam:** 30% (date to be announced)
- **Short Exams:** 3x 10% = 30% (dates to be announced)
- **Final Exam:** 40 %
- **Bonus:** 7 % (method varies between sections)

TOTAL 107%

Suggested Problems: A list of suggested problems is announced on the course website and ODTUClass. Students are encouraged to attempt to solve all of these problems in a timely manner, and ask the instructors about the ones that they cannot solve. **At least one problem in each exam, including short exams, will be chosen among these problems.**

Exams: Dates for all exams are set by the university administration. We will announce the dates as soon as they are known. Students are assigned random seating for each exam – sit according to the posted seating charts. **Calculators and cell phones are not allowed during exams** – all cell phones should be left on the desk at the front of the exam room during the exam time.

Bonus: Method of giving bonus points varies between sections. Each instructor will inform how bonus points will be given at the beginning of the semester.

NA Policy: If you miss all midterm exams and final exam, you will receive a grade of NA for the course.

Math Help Room: The mathematics help room in T-103 is a room staffed by mathematics faculty and teaching assistants where students may gather to ask questions, work on homework, and view exams. Office hours of instructors will be held in the [mathematics help room](#) (T-103).

Make-up Policy: In order to be eligible to enter the make-up examination, a student should have a documented or verifiable and officially acceptable excuse. **It is not possible to make up multiple missed exams.** The make-up examination will be after the final exam, **and will include all topics.**

Cheating Policy: Cheating on any midterm or short exam will result in any of the following: (1) immediate score of ZERO on that exam, (2) immediate grade of FF in the course, (3) forwarding the case to the university disciplinary committee.

Lectures		
S1 - A. Dosi	Tue 08:40-10:30 Thu 08:40-10:30	SZ-25
S2 - İ. Ünal	Mon 15:40-17:30 Thu 10:40-12:30	TAZ-10

	Office	Phone	Email
Anar Dosi	T-126	3003	dosiev@
İbrahim Ünal	R-134	2916	uibrahim@

Week 1: Feb. 16-20	1	Introduction, Directional Fields Chapter 2. First Order Differential Equations §2.2: Separable equations (also homogeneous equations - see p49 #30).
	2	§2.1: Linear equations; Method of integrating factors. §2.3: Modeling with first order equations (tank problems).
Week 2: Feb. 23-27	3	§2.4: Differences between linear and nonlinear equations (existence and uniqueness theorems).
	4	§2.6: Exact equations and integrating factors.
Week 3: Mar. 2-6	5	Chapter 7. Systems of First Order Linear Equations §7.1: Introduction. §7.2: Review of matrices.
	6	§7.3: Systems of linear algebraic equations; Linear independence, eigenvalues, eigenvectors.
Week 4: Mar. 9-13	7	§7.4: Basic theory of systems of first order linear equations. §7.5: Homogeneous linear systems with constant coefficients.
	8	§7.5: Homogeneous linear systems with constant coefficients. (cont.) §7.6: Complex eigenvalues.
Week 5: Mar. 16-20	9	§7.7: Fundamental matrices.
	10	§7.8: Repeated eigenvalues. §7.9: Nonhomogeneous linear systems (variation of parameters only).
Week 6: Mar. 23-27	11	Chapter 4. Higher Order Linear Equations §4.1: General theory of n^{th} order linear equations.
	12	§4.2: Homogeneous equations with constant coefficients.
Week 7: Mar. 30-Apr.3	13	Chapter 3. Second Order Linear Equations §3.2: Solutions of linear homogeneous equations; Wronskian
	14	§3.3: Complex roots of the characteristic equation.
Week 8: Apr. 6-10	15	§3.4: Repeated roots; Reduction of order. .
	16	§3.5: Nonhomogeneous equations; Method of undetermined coefficients
Week 9: Apr. 13-17	17	§4.3: The method of undetermined coefficients.
	18	§3.6: Variation of parameters.
Week 10: Apr. 20-24	19	§3.7: Mechanical and electrical vibrations.
	20	§3.8: Forced Vibrations.
Holiday: Thursday, April 23		
Week 11: Apr. 27-30	21	Chapter 6. The Laplace Transform §6.1: Definition of the Laplace transform. §6.2: Solution of initial value problems.
	22	§6.3: Step functions.
Holiday: Friday, May 1		
Week 12: May. 4-8	23	§6.4: Differential equations with discontinuous forcing functions.
	24	§6.5: Impulse functions. §6.6: The convolution integral.
Week 13: May. 11-15	25	Chapter 10. Partial Differential Equations and Fourier Series §10.A: Derivation of the Heat Conduction Equation. §10.1: Two-point boundary value problems.
	26	§10.2: Fourier series. <i>§10.3: The Fourier convergence theorem (briefly).</i>
Week 14: May. 18-22	27	§10.4: Even and odd functions.
	Holiday: Tuesday, May 19	
	28	§10.5: Separation of variables, heat conduction in a rod.
FINAL EXAM		