

MATH 219 Introduction to Differential Equations (2015-16 Fall)

Frequency: Fall/Spring Terms

Credit: 4

Course Coordinator: Benjamin Walter

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ODTU-Class: [MAT 219 All Sections]

Class notes, grades, homeworks, and announcements will be posted on ODTU-Class.

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

(Also see the class notes of Ö. Kişisel and B. Walter posted on ODTU-Class.)

Exams and Grading: Course grades are determined by two (non-cumulative) midterm exams, a cumulative final exam, a small amount of weekly webwork and some bonus.

- **Midterm Exams:** 2x 30% = **60 %** (dates to be announced)
- **Final Exam:** **35 %**
- **Weekly WebWork:** **5 %** (2 problems per lecture, due Monday at 10:30)
- **Bonus:** **5 %** (determined by written problem solutions or problem solutions during course)

The FD / DD cutoff will be 45. The BA / AA cutoff will be 87. Other letter grades will be distributed evenly (every 7 points).

Written and Suggested Problems: A list of suggested problems from the book is posted on ODTU-Class, solving these is optional but recommended. Also, a small set of further problems will be posted weekly on ODTU-Class; every other week, one of these will be indicated as written homework to be turned in and graded. Every week a small assignment will be posted to WebWork. **At least 50% of the exam will be chosen from these problems.**

Exams: Dates for all exams are set by the university administration. We will announce the dates as soon as they are known.

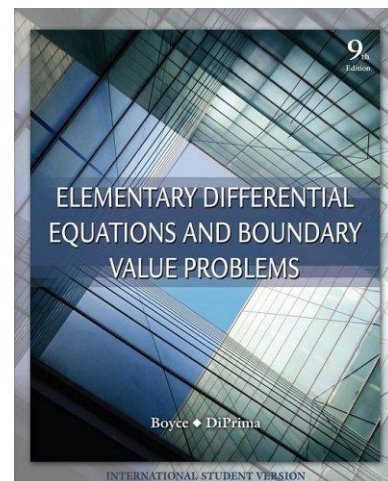
Students are assigned random seating for each exam – sit according to the posted seating charts. **Calculators and cell phones are not allowed during exams** – all cell phones should be left on the desk at the front of the exam room during the exam time.

Bonus: Bonus points will be awarded by instructors. Policy will vary between sections.

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. The help room schedule is posted online.

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 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 - B. Walter	Mon 13:40-15:30 Thu 8:40-10:30	TZ-20
S2 - B. Walter	Mon 10:40-12:30 Wed 10:40-12:30	TZ-19
S3 - A. Dosi	Tue 10:40-12:30 Thu 10:40-12:30	S-121
S4 - A. Dosi	Mon 10:40-12:30 Wed 10:40-12:30	S-121
S5 - K. Aker	Wed 13:40-15:30 Fri 13:40-15:30	TZ-19
S5 - K. Aker	Mon 13:40-15:30 Thu 8:40-10:30	TZ-07

	Office	Phone	Email
Kürşat Aker	TZ-42	3433	kaker
Anar Dosi	T-126	3003	dosiev
Benjamin Walter	T-124	3001	benjamin

Office hours are held in the [Math Help Room](#).

- **Add-drop period:** October 12-16
- **Withdrawal period:** December 7-11

Week 1: Oct.5-9	1	Introduction, Directional Fields Chapter 2. First Order Differential Equations §2.2: Separable equations (also homogeneous equations - see #30 on page 49).
	2	§2.1: Linear equations; Method of integrating factors.
Week 2: Oct.12-16	3	§2.3: Modeling with first order equations (tank problems).
	4	§2.4: Differences between linear and nonlinear equations (existence and uniqueness theorems). §2.6: Exact equations and integrating factors.
Week 3: Oct.19-23	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.
Make-Up: Thursday lecture on Saturday, October 24		
Week 4: Oct.26-30	7	§7.4: Basic theory of systems of first order linear equations. §7.5: Homogeneous linear systems with constant coefficients.
	8	§7.5: <i>Homogeneous linear systems with constant coefficients (continued)</i> . §7.6: Complex eigenvalues.
Holiday: Thursday, October 29		
Week 5: Nov.2-6	9	§7.7: Fundamental matrices.
	10	§7.8: Repeated eigenvalues. §7.9: Nonhomogeneous linear systems (variation of parameters only).
Week 6: Nov.9-13	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: Nov.16-20	13	Chapter 3. Second Order Linear Equations §3.2: Linear independence and the Wronskian.
	14	§3.3: Complex roots of the characteristic equation.
Week 8: Nov.23-27	15	§3.4: Repeated roots; Reduction of order.
	16	§3.5: Nonhomogeneous equations; Method of undetermined coefficients.
Week 9: Nov.30- Dec.4	17	§4.3: The method of undetermined coefficients.
	18	§3.6: Variation of parameters.
Week 10: Dec.7-11	19	§3.7: Mechanical and electrical vibrations.
	20	§3.8: Forced Vibrations.
Week 11: Dec.14-18	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.
Make-Up: Wednesday lecture on Saturday, December 19		
Week 12: Dec.21-25	23	§6.4: Differential equations with discontinuous forcing functions.
	24	§6.5: Impulse functions. §6.6: The convolution integral.
Holiday: Wednesday, December 23 Make-Up: Friday lecture on Saturday, December 26		
Week 13: Dec.28- Jan.1	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. §10.3: <i>The Fourier convergence theorem (briefly)</i> .
Holiday: Friday, January 1		
Week 14: Jan.4-8	27	§10.4: Even and odd functions.
	28	§10.5: Separation of variables, heat conduction in a rod.
FINAL EXAMS January 11 -- January 23		