

CSE386M/EM386M FUNCTIONAL ANALYSIS IN THEORETICAL MECHANICS
Fall 20, # 64385, # 13625/ MW 3:00 - 4:30

Text: J. T. Oden, L. Demkowicz, *Applied Functional Analysis*, CRC Press, 2018 (third edition).

Week	Topic	Chapter
Aug. 26-Aug.28 1	Preliminaries: set theory, logic, relations	1.1-1.10
Aug. 31-Sep. 4	Functions, cardinality of sets	1.11-1.14
Sep. 9 -Sep. 11	Elementary topology in \mathbb{R}^n	1.17-1.20
Sep. 14 -Sep. 18	Vector spaces	2.1-2.4
Sep. 21 -Sep. 25	Linear transformations	2.5-2.9
Sep. 28 -Oct. 2	Algebraic duals, transpose of an operator	2.10-2.13
Oct. 5 -Oct. 9	Inner product, abstract measure	2.14, 3.1
Oct. 12 -Oct. 16	Lebesgue measure	3.2-3.3
Oct. 19 -Oct. 23	Lebesgue integral	3.4-3.5
Oct. 26 -Oct. 30	Fubini's Thm, L^p -spaces	3.6-3.9
Nov. 2 -Nov. 6	General abstract topological spaces	4.1-4.2
Nov. 9 -Nov. 13	Compactness	4.3-4.5
Nov. 16-Nov. 20	Metric spaces, Bolzano-Weierstrass Thm	4.6-4.9
Nov. 23-Nov. 25	Banach Fixed Point Thm	4.10
Nov. 30-Dec. 4	Banach Closed Range Thm - an outlook	5.6,7,12,13,16,17

Homework: Homework assignments will be made in class. The problems assigned in the class will be collected during the first class in every week (most of time on Monday...).

Exams: There will be three (closed book) exams held in POB 6.304, during evening hours (5:00-8:00 p.m.) according to the following schedule:

- Exam1 (through Section 1.20) Mon., Sep.21,
- Exam2 (through Section 3.3) Mon., Oct.26,
- Exam3 (through Section 4.9) Mon., Nov. 23.

Final Exam: Comprehensive, mandatory, closed book and remote, given during the official scheduled time.

Discussion session (obligatory): remote, through zoom, Fri, 3:00-5:00.

Instructor: Dr. Leszek Demkowicz, POB 6.326, Office hours: Mon, Wed, 4:30-5:30 (after the class).

TA: TBD.

Covid adjustments: Each lecture will be recorded and put on the web. If I travel, I may give a couple of lectures through zoom as well. This will be announced in advance. Time allowing, I intend to use a portion of Friday meeting for lecturing as well, in order to accelerate the class. **Given all these accomodations, this is NOT an online class as the three mid-term exams have to be taken in person and I would like to collect paper copies of the homework.**

Final Grade: Is based upon the final score.

Final score range	grade
85 - 100	A with recommendation letter
75 - 85	A
72 - 74	A-
68 - 71	B+
65 - 67	B
62 - 64	B-
58 - 61	C+
55 - 57	C
52 - 54	C-
48 - 51	D+
45 - 47	D
42 - 44	D-
00 - 41	F

The final score is a weighted average of the test score, three mid-term exams and the final exam, with the following weights:

Homework	- 15 %
Exams	- 15,20,20 % each
Final	- 30 %