

**CSE386M/EM386M FUNCTIONAL ANALYSIS IN THEORETICAL MECHANICS**  
**Fall 23, # 65990, # 15315, MW 3:00 - 4:30, ETC 2.132**

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

<b>Week</b>	<b>Topic</b>	<b>Chapter</b>
Aug. 21-Aug.25	Preliminaries: set theory, logic, relations	1.1-1.10
Aug. 28-Sep. 1	Functions, cardinality of sets	1.11-1.14
Sep. 5 -Sep. 8	Elementary topology in $\mathbb{R}^n$	1.17-1.20
Sep. 11 -Sep. 15	Vector spaces	2.1-2.4
Sep. 18 -Sep. 22	Linear transformations	2.5-2.9
Sep. 25 - Sep. 29	Algebraic duals, transpose of an operator	2.10-2.13
Oct. 2 -Oct. 6	Inner product, abstract measure	2.14, 3.1
Oct. 9 -Oct. 13	Lebesgue measure	3.2-3.3
Oct. 16 -Oct. 20	Lebesgue integral	3.4-3.5
Oct. 23 -Oct. 27	Fubini's Thm, $L^p$ -spaces	3.6-3.9
Oct. 30 -Nov. 3	General abstract topological spaces	4.1-4.2
Nov. 6 -Nov. 10	Compactness	4.3-4.5
Nov. 13 -Nov. 17	Metric spaces, Bolzano-Weierstrass Thm	4.6-4.9
Nov. 27 -Dec. 1	Banach Fixed Point Thm	4.10
Dec. 4	Banach Closed Range Thm - an outlook	5.6,7,12,13,16,17

**Homework:** Homework assignments will be posted in Canvas after the lectures. The homework will be collected in class during the FIRST lecture in a week (most of time Monday).

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

- Exam1 (through Section 1.20) Mon., Sep.18, POB 6.304.
- Exam2 (through Section 3.3) Mon., Oct.23,POB 6.304.
- Exam3 (through Section 4.9) Mon., Nov. 27,POB 6.304.

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

**Discussion session (obligatory):** Fri, 3:00-4:30, POB 6.304.

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

**TA:** Jiaqi Li. Office hours TBD.

**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 %