

SCHEDULE FOR 18.102/1021 SPRING 2020
TYPICALLY REVISED EACH WEEK
LAST REVISION: 29 JANUARY, 2020

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The recommended reading (preferably before the lecture in question) refers you to the lecture notes.

- (1) Feb 4: Outline, Normed spaces. Introduction, Chap 1 §§1-3.
- (2) Feb 6: Linear maps, boundedness, brief discussion of Completion of a normed space, Chap1, §§4,5.
- (3) Feb 11: Lebesgue integrable functions, measure zero, linearity of Lebesgue space Chap 1 §§6,7. Chap 2 §§1,2
- (4) Feb 13: Lebesgue integral. Completeness. Chap 2 §§3,4
Feb 18 is an MIT Monday
- (5) Feb 20: Monotone convergence, Fatou, Dominated convergence. Chap 2 §§4, 5, 6.
- (6) Feb 25: $L^2(\mathbb{R})$.
- (7) Feb 27: First Test in 2-190, material to 20 Feb.
- (8) Mar 3: Cauchy-Schwarz, Bessel's inequality, convexity. Chap 3 §§1-8
- (9) Mar 5: Convexity Lemma, Riesz' Representation, adjoints. Chap 3, §§8-11
- (10) Mar 10: Compact sets. Weak convergence. Chap 3, §12
- (11) Mar 12: Finite rank and compact operators Chap 3, §§14-16
- (12) Mar 17: Baire's theorem, Uniform Boundedness. Chap 3, §15. Chap 1 §§8,9
- (13) Mar 19: Neumann series and invertible operators, spectrum of an operator. Chap 3, §§15-17
- (14) Mar 31: Spectral theorem for compact self-adjoint operators. Chap 3 §18.
- (15) Apr 2: Functional calculus for bounded self-adjoint operators. Chap 3 §§17-19
- (16) Apr 7: Polar decomposition, Fredholm operators. Chap 3 §§21 - 23
- (17) Apr 9: Second Test in 2-190, material to 2 April.
- (18) Apr 14: Completeness of Fourier basis, Fejér kernel. Chap 4 §1
- (19) Apr 16: Toeplitz operators Chap 4 §2
- (20) Apr 21: Cauchy problem: Chap 4 §3
- (21) Apr 23: Dirichlet problem on an interval.
- (22) Apr 28: Fourier transform. Chap 4 §§8, 9
- (23) Apr 30: Fourier inversion. Chap 4 §15
- (24) May 5: Convolution and density. Chap 4 §10
- (25) May 7: Harmonic oscillator. Chap 4 §6.
- (26) May 12: Hahn-Banach and review. Chap 1 §12.

* Final exam, 3 hours, in exam period, date not yet known (to me anyway)!

REFERENCES

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