

18.100A Introduction to Analysis Fall 2009

Lectures: MWF 1-2 4-163 Prof. A. Mattuck 2-241 3-4345 *mattuck@mit.edu*

Text: Mattuck: *Introduction to Analysis* Prentice-Hall
(The 3rd or later printings require fewest corrections.)

Grading: Problem sets, two “hour” exams, final exam; each counts about 1/3

Web page: <http://math.mit.edu/~apm/18100A.html>

Has reading and exercise assignments (as they are made), practice exams (when issued), and links to corrections to successive textbook printings, plus general information about the course.

The syllabus below is only approximate. In particular, topics after Thanksgiving may be changed depending on the interests or needs of the students.

W	Sept. 9	1.	Chap. 1, App. A. Monotone seqs.; Completeness property
F	Sept. 11	2.	Chap. 2. Estimations and approximations
M	Sep 14	3.	Chap. 3. Limit of a sequence
W	Sept. 16	4.	Chap. 4, 5.1. Error term; algebraic limit theorems
F	Sept. 18	5.	Chap. 5. Limit theorems for sequences
M	Sept. 21	6.	Chap. 6.1-2. Nested intervals; cluster points
W	Sept. 23	7.	Chap. 6.3-4. Bolzano-Weierstrass theorem; Cauchy sequences
F	Sept. 25	8.	Chap. 6.5. Completeness property for sets
M	Sept. 28	9.	Chap. 7.1-5. Infinite series
W	Sept. 30	10.	Chap. 7.6-7. Infinite series
F	Oct. 2	11.	Chap. 8. Power series
M	Oct. 5	12.	Chap. 9,10. Functions; local and global properties
W	Oct. 7		Exam 1
F	Oct. 9	13.	Chap. 11.1-3. Continuity (<i>Mon. holiday, class Tues.</i>)
T	Oct. 13	14.	Chap. 11.4-5. Continuity (cont'd)
W	Oct. 14	15.	Chap. 12. Intermediate-value theorem
F	Oct. 16	16.	Chap. 13.1-3. Continuity theorems
M	Oct. 19	17.	Chap. 13.4-5. Uniform continuity
W	Oct. 21	18.	Chap. 14. Differentiation: local properties
F	Oct. 23	19.	Chap. 15. Differentiation: global properties
M	Oct. 26	20.	Chap. 16; 17 (lightly). Convexity; Taylor's theorem (skip proofs)
W	Oct. 28	21.	Chap. 18. Integrability
F	Oct. 30	22.	Chap. 19. Riemann integral
M	Nov. 2	23.	Chap. 20.1-4. Fund. thms. of calculus
W	Nov. 4	24.	Chap. 20.5-6, 21.1-2. Stirling's formula; improper integrals
F	Nov. 6	25.	Chap. 21.3-4. Gamma function, convergence
M	Nov. 9		Exam 2 (<i>Wed. holiday</i>)
F	Nov. 13	26.	Chap. 22.1-2. Uniform convergence of series
M	Nov. 16	27.	Chap. 22.3-4. Continuity of sum; integration term-by-term
W	Nov. 18	28.	Chap. 22.5-6. Differentiation term-by-term; analyticity

F	Nov. 20	29.	Chap. 24.1-5	Continuous functions on the plane
M	Nov. 23	30.	Chap. 24.6-7, 25.1	(cont'd); Plane point-set topology
W	Nov. 25	31.	Chap. 25.2-3	Compact sets and open sets
				<i>(Thanksgiving Holiday Thur. and Fri.)</i>
M	Nov. 30.	32	Chap. 26.1-2	Differentiating integrals w.r.t. a parameter
W	Dec. 2	33.	Chap. 26.2-3	(cont'd); Fubini's theorem in rectangles
F	Dec. 4	34.	Chap. 23.1-2	Countability; sets of measure zero
M	Dec. 7	35.	Chap. 23.3-4	Introduction to Lebesgue integration
W	Dec. 9	36		Continuation and review

Three-hour final exam during finals week