18.01A-18.02A Calculus Fall 2006

Admission Requirements: (strictly monitored for both subjects)

18.01A: 4 or 5 on the AB test or on the AB subscore of the BC test, or a passing grade on the A-level or IB exams, or in a comparable college calculus subject (show transcript and syllabus), or a passing grade on Part I of the M.I.T. 18.01 AP test (given R/O week);

18.02A: pass 18.01A, or AP credit for 18.01 through usual mechanisms


18.01A Supplementary Notes (sold by Copy Tech, Basement Bldg. 11)

Lectures: T-Th 1, F 2 26-100 18.01A: A. Mattuck 2-241 ext. 3-4345 mattuck@mit.edu

18.02A: John Bush 2-392 ext. 3-4387 bush@math.mit.edu


Problem Sets: Given out Thursdays in lecture; available after 2 in 2-108 (left wall);
due on a Thursday, 12:45 in 2-106: returned in recitation Monday with solutions;
unclaimed sets are put in horizontal file in 2-108 (left wall) after recitation Monday.

Web page: http://math.mit.edu/~apm/1801A.html

Has problem sets, practice exams, and corrections in pdf format

Tutoring: 2-102 Mon-Tues-Wed-Thurs: 3-5 and 7:30-9:30 PM. (Starts second week.)

Exams: 18.01A: Three hour-exams given during class period (dates on syllabus): no final.

18.02A (first half): One hour-exam (date on syllabus): two-hour midterm

Students who fail an hour exam will be notified by e-mail that evening; they can take a make-up exam once in 2-102 during tutoring hours the following week.

Grading: A grade is given for 18.01A, and a temporary grade for 18.02A (first half). Each grade is based on a cumulative total score for that half-semester. For this, each problem set counts 35-45, each hour-exam 100, the midterm 200.

In addition to this, since 18.01A has no cumulative exam, to pass 18.01A (i.e., be at level C- or better), you must pass two of the three hour exams (or their make-ups), and come reasonably close to passing on the third (or its make-up). In addition, you must make a reasonable effort on three of the four problem sets.

18.02A second half: Offered twice: Jan., and the first half of the spring semester. The final grade for 18.02A will be the average of the grades for each half. (Note that if you finish 18.02A in the spring, a grade (ABC/NR) will appear on your transcript.)

Questions: Checking grade records: 2-108; conflicts with hour exams (teams, etc.): 2-108;
concerns about homework, grading, exams, personal problems: see recit. teacher

Syllabus: A tentative outline is here; readings and exercises are in the weekly problem sets.

18.01A SYLLABUS

W Sept. 6 0. Rec.: Linear and quadratic approximations

Th Sept. 7 1. Higher order approximations; Taylor series

F Sept. 8 2. Indeterminate forms 0/0, ∞/∞; L’Hospital’s rule

Tu Sept. 12 3. Definite integral; First fundamental theorem; applications

Th Sept. 14 4. Second fund. theorem; ln x Prob. Set 1 due
F Sept. 15 5. Applications to volumes, work, average value
Tu Sept. 19 6. Applications to arclength and surface area, centroids
Th Sept. 21 7. Exam 1, covering Lectures 0-6
F Sept. 22 8. Integration by direct and inverse substitution; trig. integrals
Tu Sept. 26 9. (Holiday Mon.) Partial fractions decomposition
Th Sept. 28 10. Integration by parts Prob. Set 2 due
F Sept. 29 11. Improper integrals
Tu Oct. 3 12. Convergence of \( \sum 1/n^k \)
Th Oct. 5 13. Exam 2, covering Lectures 8-12
Th Oct. 12 15. (Holiday Mon, Tu) Continuous random vars; standard deviation Prob. Set 3 due
Th Oct. 19 18. Continuation and review Prob. Set 4 due

18.02A SYLLABUS: FIRST HALF

Vectors
Tu Oct. 24 20. Intro. to vectors; scalar product
Th Oct. 26 21. Determinants; cross product
F Oct. 27 22. Matrices; inverse matrices
Tu Oct. 31 23. Theorems about square systems; Cramer’s rule, eqns. of planes
Th Nov. 2 24. Parametric eqns: eqns. of lines and curves; cycloid Prob. Set 5 due
F Nov. 3 25. Vector derivatives
Tu Nov. 7 26. Applications; Kepler’s second law
Th Nov. 9 27. Exam 1, covering Lectures 20-26 (Holiday Fri.)

Partial Differentiation
M Nov. 13 Rec.: Intro to fcns. of sev. vars.; graphs, partial derivs.
Tu Nov. 14 28. Tangent plane approximation; directional derivative
Th Nov. 16 29. Gradient; contour surfaces, tangent planes Prob. Set 6 due
F Nov. 17 30. Max-min problems; method of least squares
Tu Nov. 21 31. Second derivative criterion. Lagrange multipliers. (Holiday Th., Fri.)
Tu Nov. 28 32. Chain rule and applications
Th Nov. 30 33. Chain rule: non-indept. variables Prob. Set 7 due

Double Integration
F Dec. 1 34. Double and iterated integrals in rectangular coordinates
Tu Dec. 5 35. Polar coordinates; Double integrals in polar coords.
Th Dec. 7 36. Continuation; Applications of double integration Prob. Set 8 due
F Dec. 8 37. Change of variable in double integrals
Tu Dec. 12 38. Continuation and review

Two-hour midterm exam covering 18.02A (20-38) during finals week