18.01A-18.02A Calculus  Fall 2008

A syllabus is given below; specific readings and exercises are on the problem sets.)

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 comparable grade on the A-level or IB exams, or in a comparable college calculus subject (show transcript and syllabus), or a pass 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  3-4345  mattuck@mit.edu
18.02A  John Bush  2-392  3-4387  bush@math.mit.edu

Administrator:  Stevie Gallarelli  2-108  3-4977  nonna@math.mit.edu

Recitations:  M-W; change section on Grade Management (cf. “18.01A Website” below)

Problem Sets:  Given out Thursdays in lecture; available afterwards on 18.01A website; due on Thursdays, 12:45 in 2-106; returned in recitation following Monday with solutions; unclaimed sets put in horizontal file in 2-108 (left wall) after recitation Monday.

18.01A Website:  http://math.mit.edu/~apm/1801A.html

Has problem sets, practice exams, and corrections in pdf format, and link to Grade Management website, where you can check your record (grades on exams and problem sets).

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

Exams:  18.01A:  One hour-exam; two-hour evening final (dates on syllabus).
18.02A (first half):  One hour-exam; two-hour midterm during finals week.

Students who fail an hour-exam receive e-mail that evening; they can take a make-up exam once during certain hours the following week. (No make-ups for the two-hour exams.)

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, each two-hour-exam 200.

In addition to this, to pass 18.01A (i.e., be at level C- or better), you must pass the two exams and make a reasonable effort on three of the four problem sets. Students who do not pass 18.01A Exam 1 (or its makeup) must transfer to 18.01.

Exceptions to these for borderline fails will be considered on a case-by-case basis.

18.02A second half:  Offered twice: IAP (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 letter grade (ABC/NR) will appear on your transcript.)

Questions:  Academic problems and concerns: Recitation Teacher
Problems with exams or homework (away games, illness, emergencies): Administrator

18.01A SYLLABUS

W  Sept.  3  0.  Rec.:  Linear and quadratic approximations
Th  Sept.  4  1.  Higher order approximations; Taylor series
F  Sept.  5  2.  Indeterminate forms 0/0, ∞/∞; L’Hospital’s rule
Tu  Sept.  9  3.  Definite integral; First fundamental theorem; applications
Th Sept. 11  4. Second fundamental theorem; ln $x$  Prob. Set 1 due
F Sept. 12  5. Geometric applications: volumes, arc length, surface area
Tu Sept. 16  6. Other applications: work, average value
Th Sept. 18  7. Integration by direct and inverse substitution; trig. integrals  Prob. Set 2 due
F Sept. 19  8. Partial fractions decomposition
Tu Sept. 23  9. (*Holiday Mon.*) Integration by parts
Th Sept. 25  Exam 1, covering Lectures 0-9
F Sept. 26  10. Improper integrals
Tu Sept. 30  11. Infinite series: integral test, convergence of $\sum 1/n^k$
Th Oct. 2  12. Geometric series; ratio test  Prob. Set 3 due
F Oct. 3  13. Power series, radius of convergence; short-cuts to expansions
Tu Oct. 7  14. *Holiday Mon.* Intro. to probability: discrete random variables, Poisson
Th Oct. 9  15. Continuous random vars; standard deviation  Prob. Set 4 due
F Oct. 10  16. Normal distribution; applications
Tu Oct. 14  17. Continuation of probability
Th Oct. 16  18. Review. Two-hour final in evening, covering 0-18  (*No class Fri.*)

18.02A SYLLABUS: FIRST HALF

Vectors

Tu Oct. 21  20. Scalar (dot) product
Th Oct. 23  21. Determinants; cross product
F Oct. 25  22. Matrices; inverse matrices
Tu Oct. 28  23. Theorems about square systems; Cramer’s rule, eqns. of planes
Th Oct. 30  24. Parametric eqns: eqns. of lines and curves; cycloid  Prob. Set 5 due
F Oct. 31  25. Vector derivatives
Tu Nov. 4  26. Applications; Kepler’s second law
Th Nov. 6  27. Exam 1, covering Lectures 19-26

Partial Differentiation

F Nov. 7  28. Intro to fcns. of sev. vars.; graphs, level curves, partial derivs, tangent plane approximation
Th Nov. 13  29. *Holiday Mon., Tues.* 2D-DIRECTIONAL DERIVATIVE, GRADIENT.
F Nov. 14  30. Applications in 3D - contour surfaces, tangent planes.
Tu Nov. 18  31. Max-min problems; method of least squares
Th Nov. 20  32. Second derivative criterion. Lagrange multipliers. Prob. Set 6 due
F Nov. 21  33. Chain rule and applications.
Tu Nov. 25  34. Chain rule for non-indept. variables

Double Integration

Tu Dec. 2  35. *Holiday Th., Fri.* Double and iterated integrals in rect. coord’s
Th Dec. 4  36. Polar coordinates. Double integrals in polar coord’s, applications  Prob. Set 7 due
F Dec. 5  37. Change of variable in double integrals; jacobians
Tu Dec. 9  38. Continuation and review

covering 18.02A first half (19-38)