

Prerequisites MA 112 and a grade \geq "C" in MA 113. Enforcing prerequisites is the responsibility of the Instructor; there is no automatic enforcement by the Registrar.

Textbook "Calculus" 5th ed. James Stewart

Syllabus/Calendar A course Calendar is attached. Each instructor should also give every student an individual syllabus giving their name, contact information and office hours, as well as additional information about grading policy. See *University Rules* below.

University Rules The University Ombud has made several requests concerning syllabi and other requirements of University Rules:

1. The syllabus should describe curving policy. This is apparently in response to instructors who used "negative curves".
2. Describe carefully what is meant by an excused absence, if attendance will be used in grading. You may have any student who misses both the first two class meetings dropped from the course. Just take a list of names to Cindy Iten, in POT 257.
3. All teachers must provide undergraduate students with a Midterm Evaluation of their course performance by Friday, Oct. 21, 2005.
4. No examinations (except make-ups) are to be given the last week preceding Final Examinations.
5. Please see the ombud's memo for the full story.

Math resource center The mathematics resource center or Mathskeller is in room 65 in the basement of the Classroom Building. Tutorial help is available for all 100-level MA courses. All teaching assistants for MA 114 are asked to schedule at least one of their office hours in this facility (and a total of three office hours). After this week, Mathskeller hours are 8-8 MTWR, 8-5 F. There will probably be additional hours just before Midterm Examinations.

Exams There will be three exams and a final. These exams are scheduled in the evening at the times shown in the course syllabus. Rooms for exams will be assigned after classes begin. If you don't want to write your own, feel free to join other lecturers to write a common exam. Note that there is a uniform time for the Final Examination in MA 113, *but not for MA 114*.

Please emphasize to your students that they should try to clear their schedule for these exams. Students are allowed to register for a course that meets at the same time as a common exam. Students are required to give their instructor two weeks notice, in writing, of any conflict of a Common-Hour Exam with a class, and the instructor

is required to give an alternate exam. With this much notice, it should be possible for lecturers to write a common alternate exam, if they want to. See p.20 "Fall 2005 Schedule of Classes" for details. (Note that alternate exams are only required for students with *excused* absences.) Instructors in evening classes generally give their exams during a regularly scheduled class meeting.

Homework There are no paper graders for MA114. It is expected that TA's and faculty will share equally in grading examinations and quizzes.

MA 194 In addition to the 4 hours of credit for MA 114, the department offers one additional hour of credit for MA 194 on a pass/fail basis. Instructors may set their own grading policy for MA 194. MA 194 is the Recitation section of MA 114. Hence, it is appropriate to require students to attend MA 194, and to use attendance/participation in course grades for MA 114, even if the student is not enrolled in MA 194. Below are a few common questions about MA 194.

Must a student take MA 194? No, unless the student is in MathExcel. MathExcel students must take MA 194.

What section of MA 194 should a student register in? Students should register in the same section number for both MA 194 and MA 114. If a student drops or changes sections of MA 114, they should also drop or change sections of MA 194. Instructors and teaching assistants should check their MA 194 rolls near the end of the semester. If there is a name that is unfamiliar, please try to determine if the student is registered in another section of MA 114.

Can MA 194 be repeated? Yes, though there is little benefit to this.

Can MA 194 be taken without MA 114? Yes, though it is not recommended.

Problems Students should try to resolve problems with their instructor and/or teaching assistant. If this is not successful, they should contact the departmental ombud, Prof. Ted Suffridge.

Calculators Most students are familiar with graphing calculators such as the TI-82. These calculators allow students to graph functions, solve equations, evaluate derivatives and definite integrals numerically. Elizabeth has TI-82 calculators that each instructor may check out. I suggest that students be allowed to use such calculators on exams. Test questions should be written so that it is clear whether a numerical answer from the calculator is acceptable or if students must carry out the computation by hand. In addition, some students will have machines that can carry out symbolic computations. I suggest that students *not* be allowed to use these on exams. Examples include the TI-89, TI-92, the HP48 and, of course, laptop computers.

Computer labs The math department has a computer lab, Inslab, that instructors may use. See <http://www.ms.uky.edu/~inslab> for more information. This lab has Maple and Matlab available. The university also maintains numerous computer labs where students may use Maple and other mathematical software. These labs contain classrooms that may be reserved.

Calendar A course calendar for fall 2005, using Stewart 5, is attached. The sequence of topics is unchanged from spring 2005. If you last taught MA 114 from Stewart 3, the changes are described below.

Changes from Stewart 3 The chapter on Series has been moved to much earlier in the term. The reason for this is that it's the hardest topic for students, and at the end of the semester one frequently runs short of time. (I heard no complaints about this new ordering last spring. More generally, there is the question of how much we should be covering on series. My personal preference is to omit the Integral, Comparison and Root tests, and devote the time to Power Series.)

Chap. 7 Inverse Functions In recent semesters, I have followed 7.2*, 7.3*, 7.4* (ln via integral first, then exp as $\ln(-1)$). However, many students could not use the properties of ln correctly. Perhaps doing 7.2, 7.3, and 7.4 instead would give better results. Exponential Growth and Decay has been removed from this Chapter and put in a new (and longer) Chap. 10 on Differential Equations. Two sections from Chap. 10 are at the end of the semester.

Chap 11 Parametric Eq'ns & Polar Coord's Arc Length has been dropped (it is covered in Calc III). Conic Sections has been added, to prepare for Multiple Integrals in Calculus III.

Corrections Please send me your comments and corrections; I hope that we can make further refinements. I've never taught from Stewart 5 and the problem sets are quite different from Stewart 3. That's why there are no recommended assignments.

Suggestions on Teaching

What follows describes my most recent experience teaching MA 114. Feel free to use or ignore any of it.

Format Three lectures/week to 70-100 students; Two 75-min recitations, lead by TA's; no paper graders; three mid-term examinations on Tuesday nights, written by individual lecturers. No uniform time for the Final Examination.

Homework Assignments: I assigned 9-12 problems at each lecture.

First Method: Before the first exam, students did not have to submit any homework. I said that at least half the problems on the exam would be taken directly from the homework, possibly with changed coefficients. Exam 1 was a disaster (40% E). Also, the TA's said that the students were not doing the homework

Second Method: After Exam 1, the TA's suggested a change. Each assignment had to be submitted at the following lecture; each recitation section in a separate stack. Homework

was returned at the next lecture, sorted by section and alphabetically within section. There was a two-point maximum on each assignment, 1 for handing it in with most of the problems attempted, 1 more if they attempted the problem that I told the TA's to examine. One TA would assign a score to all students, and record it on an Excel spreadsheet. The problems were not checked for correctness. The TA's said that they could do this very quickly. Homework scores were 15% of the course grade. Exam 2 scores were much better (18% E), and most of the students were doing most of the homework.

Quizzes Initially, Practice Quizzes were given each week in recitation and graded by TA's. After Exam 1, we stopped Quizzes and collected homework.

Attendance From the beginning, attendance at recitations was mandatory; the recitation grade (10% of course grade) was reduced by 10% for each unexcused absence. After Exam 1, attendance at lecture was effectively mandatory, since they had to be there to turn in homework. (Some students would leave during the lecture; I made no attempt to stop this.)

Student Preparation I collected Calculus I grades from each student at the first class. I told those who had D or E in Calculus I to withdraw.

While teaching Techniques of Integration, it became obvious that they did not know standard integrals. I gave a 15 min. test in lecture over the Quick Reference Card, #1-3, 5-14, 19, and 20. This counted as part of Exam 2.

Their knowledge of trigonometry was poor. We had another 15 minute test in lecture over the Trig Reference page at the front of the text. (The entire left column, plus the first 10 Fundamental Identities, Double and Half-Angle Formulas.) This counted as part of Exam 3. I think that both tests helped a lot. Next time, I'll give these memory tests earlier.

TA Supervision I met with them once a week to discuss what we were doing, plans and student performance. They got copies of all assignments, and all class handouts. They did not see the tests until 30 minutes before they were given. (I had no reason to distrust any of them, but I wanted to eliminate student complaints about "unfair information given by TA's for other sections".) I observed each of them teach once. I wish that I had done it earlier; there were a number of obvious things that needed to be done differently.

Record Keeping If you keep class records on a spreadsheet, and more than one person prepares some of the data, I suggest being rather rigid about the format. Next time, I wouldn't copy SIS data into Excel until after the last day to add; then I'd make sure that no names were ever deleted.

Grades 14% A, 20% B, 23% C, 11% D, 16% E, 17% W.

Student Comments Most students liked required homework, with credit being given for attempts instead of correctness. Some students complained about the recitation being boring and not well-structured. Apart from trying to correct this in my weekly meeting with TA's, I didn't have time to do anything more. Several students requested Quizzes over Series, but I thought that the TA's had enough to do.

Date	Day	Sec	Topic	Comments
24-Aug	W	5.5	Review Substitution rule	
26-Aug	F	7.1	Inverse functions	
29-Aug	M	7.2*	The Natural Log Function	An alternative is 7.2, 7.3, 7.4.
31-Aug	W	7.3*	The Natural Exponential Function	
2-Sep	F	7.4*	General Log and Exponential Functions	
5-Sep	M		Labor day, academic holiday	
7-Sep	W	7.5	Inverse trigonometric functions	
		7.7	Indeterminate forms and L'Hopital's rule	
9-Sep	F			
12-Sep	M	7.7	Cont'd	
14-Sep	W	8.1	Integration by parts	Last day to drop without a grade
		8.2	Trigonometric integrals	
16-Sep	F		Review	
19-Sep	M		Review	
20-Sep	T		Examination 1, 7:30-9:30PM	
21-Sep	W	8.3	Trigonometric substitution	
23-Sep	F	8.4	Integration by partial fractions	
26-Sep	M	8.5	Strategy for integration	
28-Sep	W	8.6	Tables of Integrals	
30-Sep	F	8.7	Approximate integration	
3-Oct	M	8.8	Improper integrals	
5-Oct	W	12.1	Sequences	
7-Oct	F		Fall Break-Academic Holiday	
10-Oct	M	12.2	Series	
12-Oct	W	12.3	Integral test	
14-Oct	F		Review	
17-Oct	M		Review	
18-Oct	T		Examination 2, 7:30-9:30PM	
19-Oct	W	12.4	Comparison tests	
21-Oct	F	12.5	Alternating series	Last day to drop with a "W"
24-Oct	M	12.6	Absolute convg. and the ratio test	
26-Oct	W	12.7	Strategy for testing series	
28-Oct	F	12.8	Power series	
31-Oct	M	12.9	Represent fcn's as pwr series	
2-Nov	W	12.10	Taylor and MacLaurin series	
4-Nov	F	12.10	cont'd	
7-Nov	M	12.12	Applications of Taylor polynomials	
9-Nov	W	12.12	cont'd	
11-Nov	F		Review	
14-Nov	M		Review	
15-Nov	T		Examination 3, 7:30-9:30PM	
16-Nov	W	11.1	Curves defined by parametric eq'ns	
18-Nov	F	11.2	Calculus with parametric Curves	
21-Nov	M	11.3	Polar Coordinates	
23-Nov	W	11.4	Areas in Polar Coordinates	
24-Nov	Th		Thanksgiving day, academic holiday.	
25-Nov	F		Academic holiday.	
28-Nov	M	11.5	Conic Sections	
30-Nov	W	10.3	Separable Differential Eq'ns	
2-Dec	F	10.4	Exponential growth and decay	
5-Dec	M		Review	
7-Dec	W		Review	
9-Dec	F		Review	Last Class
			Final Exam depends on lecture time.	See Fall 2005 Sched. of Classes, p 20

