18.03: Differential Equations
Spring, 1999

Lectures: Monday, Wednesday, Friday at 1:00 in 54-100 and at 2:00 in 10-250.
Professor Haynes Miller
2-237, 3-7569, `hrm@math.mit.edu`, `http://www-math.mit.edu/~hrm/`.
Office Hours: variable; announced in lecture and on my home page.

Texts: Edwards and Penney, *Elementary Differential Equations with Boundary Value Problems*, Third Edition; Polking, *Ordinary Differential Equations using Matlab* (bundled with Edwards and Penney at the COOP); and 18.03 Notes, Problems, and Solutions, sold by Graphic Arts in the basement of Building 11.

Recitations: These small groups will meet twice a week, on Tuesday and Thursday, to discuss the course material. Go to the section to which you have been assigned. If you need to change sections, you must do this through the Undergraduate Mathematics Office (the UMO), 2-108. Your recitation leader is your first line of defense against confusion. Ask questions early and often. A large part of this course is vocabulary, and you must talk about it to understand it. Your recitation leader will also hold office hours, a resource you should not overlook. Another resource of great value is the

Tutoring Room: M–Θ, 3:00–5:00 and 7:30–9:30 PM, Room 2-102. This is staffed by experienced undergraduates. Extra staff is added before hour exams. This is a good place to go to work on homework.

Grading: Nine Homework Assignments, 25%
Three Hour Exams, 33%
One Final Exam, 42%

Homework: Assignments (except for PS1) will be due on Fridays, by 1:00, in the appropriate box in the doorway at 2-106, next door to the UMO. Each homework assignment will have two parts: a first part drawn from the book or notes, and a second part consisting of problems which will be handed out. The first part will be checked over only briefly, and will contribute less than one-third of the grade on the problem set. The second part will be graded with care, and solutions will be available in the UMO and on the Web on Friday afternoon. Both parts will be keyed closely to the lectures, and you should form the habit of doing the relevant problems after each lecture and not try to do the whole set on Thursday night. Your recitation leader should have the graded problems sets available for you at the next recitation.

I have a strict policy on joint work on homework: I encourage it. But if you do your homework assignments in a group, please write on your solution sheet the names of the students you worked with.

Wednesday edition

Hour Exams: Hour exams will be held during the lecture hour, on the following three Wednesdays: February 17, March 17, and April 21. Each lecture will be split between two examination rooms, which will be announced in lecture and on the web. If you must miss an exam, go to the UMO *before the exam* to arrange for a make-up which can be granted under certain limited circumstances such as illness or family emergency.

Final Exam: There will be a three hour comprehensive examination.

Matlab: An important component of this course will be the use of the computer program MATLAB. This is standard Athena courseware. A couple of special packages accompany the book by Polking and are contained in the standard Athena installation of MATLAB, and can be downloaded from the web as described in PS1 (the first problem set).

Home page: `http://www-math.mit.edu/18.03/`. Here you will find a variety of information about this course, including this syllabus, office hours, problem sets, solutions, practice exams, occasional handouts, and Professor Miller's own ideas of what he said or at least what he wanted to say in lecture.

The following is a slight revision of the partial syllabus handed out in recitation.

Partial Syllabus

I. First-order Differential Equations

W 3 Feb	Class 1	Separable equations: EP 1.1, 1.4
F 5 Feb	Class 2	Direction fields and solutions: EP 1.3, Notes G.1–2; MATLAB: Polking 1–14
M 8 Feb	Class 3	Linear first order equations: EP 1.5
	PS1 Due Wednesday by 1:00	
W 10 Feb	Class 4	Applications and substitutions: EP 1.6
F 12 Feb	Class 5	Autonomous equations; the phase line: EP 1.8, 7.1
T 16 Feb	Class 6	Symbolic methods using MATLAB: Polking 50–59
W 17 Feb	Class 7	**Hour Exam I**
F 19 Feb	Class 8	Numerical methods: EP 6.1, 6.3, Notes G.3
M 22 Feb	Class 9	Numerical methods using MATLAB: Polking 70–78

Other topics:

Second Order Linear Equations

First Order Systems

Laplace Transform

Partial Differential Equations and Fourier Series