

MTH U-152

Fall 2006

Calculus and Differential Equations for Biology 2

Mon, Wed, Thurs 9:15 a.m.-10:20 a.m.; Rm: 202 Kariotis Hall

“Text”: *Calculus and Its Applications* 10th ed., by Goldstein, Lay, and Schneider

Instructor: **Marcus Fries**
Office: **521 Lake Hall**

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Office Hours:

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Course Description: MTH 152 is the second semester of the two semester Calculus and Differential Equations sequence for Biology and Life Science majors. The course will cover chapters 6 through 11 of the “text” (roughly) as an introduction or reintroduction to Integral Calculus, in order to get quickly back to differential equations commonly used by biologists, which forms the goal of the course. This “Math for Biologists” course is innovative, explaining the use of quotes around the word text, our book is there as a security blanket, the course will rely heavily upon material that will be distributed to you.

Prerequisites: YOU MUST KNOW MTH 151! If you are weak in this area, you should consider 151, or even 121.

Grading:

Quizzes	60%
Final	40%

Homework: Doing the homework is required. Homework is **not** optional. You are responsible for having done the problems from the section discussed in the previous class. Discussion of homework will form the first part of class, if you do not have questions for me, then I will have questions for you! I will not be collecting/grading your work; however, I advise that you save your homework, for your own review purposes, but also in case I need proof that you’ve done it.

Class Participation: You are required to attend class, and encouraged to participate. All cell-phones must be turned off; and if you are late, try not to disrupt the class. If, for some reason, you must leave early, let me know beforehand.

Quizzes: Expect a quiz each week, most likely at the end of Thursday’s class. Quizzes will be based on the material covered the previous Wednesday and Thursday plus Monday of the current week. There will be no make-ups. Excuses are only for documented, severe medical problems. **Any excuse given once you have already missed the quiz is a weak one.**

Closing Remarks: Please do not fall behind, come to class. See me for help early on, and/or go to 540 Nightingale Hall for free math-tutoring, no appointment required! If you have a problem that I can’t resolve, you may see Professor Blank (blank@neu.edu) of the math department.

“It is university policy that no grade, including an incomplete, can be changed after one year. Exceptions must be authorized by the Academic Standing Committee.”

“All students without legitimate conflicts will take the final exam at the scheduled time. Do not make travel plans that conflict with the final exam.” Our **final** is scheduled for **December 15 at 8:00 a.m.**

MTH 152 Course Outline

- Integral Calculus
 - Antiderivative and Areas Under Curves
 - Definite Integrals
 - Properties of Definite Integrals
 - *Numerical Integration
- Integration Techniques
 - Substitution
 - Parts
 - *Partial Fractions*
 - Definite Integrals
 - *Advanced Numerical Techniques
 - Improper Integrals
 - Separation of Variables
- Linear Algebra
 - *Matrix, Matrices*
 - *Inverses of Matrices*
 - *Determinants*
 - *Eigenvalues*
 - *Matrices and Differential Equations*
- Systems of Differential Equations
 - *Two and Three Compartment Problems*
- *Numerical Methods
 - *Euler's method*
 - *Numerical solutions for circular reactions*
 - *Numerical solutions of higher order equations*
- Etc.
 - *Michaelis-Menten Processes*
 - *Control systems*
 - *Tracer experiments - Inflow and outflow through Cell Membranes*
- Functions of Several Variables
 - Partial Derivatives
 - Maxima and Minima of Functions of Several Variables
 - Lagrange Multipliers and Constrained Optimization
 - Total Differentials and Their Applications
 - Method of Least Squares
 - Double Integrals
- Taylor Polynomials and Infinite Series
 - Taylor Polynomials
 - Infinite Series
 - Taylor Series
 - *Series Solutions to Differential Equations*

Key: * denotes if time permits, *italics* denotes not in the textbook.

Homework Problems from the Text

<u>Chap</u>	<u>Sec</u>	<u>Page</u>	<u>Problems</u> (odd problems only unless otherwise specified)
6	1	315	2, 3, 5, 7, 11, 15, 17, 19, 23, 25, 27, 33, 35, 37, 39, 44, 49
	*2	325	1, 2, 5, 9, 15
	3	336	1, 3, 7, 9, 11, 13, 19, 25, 27, 29, 31, 33, 47
	*4	346	1, 3, 5, 9, 11, 17, 19, 23, 25
	5	351	1, 3, 5, 7, 8, 9
	Sup	363	45, 67
8	1	434	5 - 17
	2	440	1 - 11, 21, 23, 27, 31, 37
	3	449	1 - 29, 33, 35, 37, 39, 40, 43
	*4	455	13 - 31
	Sup	457	56, 57, 58
9	1	462	1 - 13, 17, 19, 23, 25, 31, 37, 41, 45, 47
	2	467	1, 5, 9, 13, 17, 21, 25 - 29, 33 - 37
	3	475	1 - 15
	*4	481	1, 5 - 13, 29
	5	489	9 - 12 (all)
	6	495	1 - 17, 21 - 25, 31 - 35, 39, 41, 45
10	2	515	1 - 5, 9, 13, 15, 19, 21, 25, 29, 32, 35, 37, 38
	6	541	3, 5, 6, 7, 9 - 13 (all), 18, 21 - 26 (all)
7	1		1 - 5, 15 - 19, 23, 25
	2		1, 5, 9, 13, 15, 19, 23, 33, 38
	3		1 - 15, 17, 19, 23, 25
	4		1, 3, 5, 17, 19, 23
	5		1 - 7, 8, 9, 11, 15
	6		1, 3, 5
	7		1 - 13
11	1		1 - 9, 13, 17, 21, 25
	2		1 - 5, 11, 19
	3		1 - 7, 11, 29, 31
	4		1, 3, 5, 9, 13
	5		1 - 7, 11, 15, 39
12	1		1, 3, 7
	2		1, 5, 7, 9, 13, 15, 17
	3		1, 3
	4		1, 3, 5, 14, 15, 17, 19, 21, 25
	5		1, 3, 6, 17
	Sup		1, 3, 7, 8, 19, 23