Carnegie Mellon University

Department of Mathematical Sciences

21-124 Lec1 Calculus II for Biologists and Chemists

Instructor: Dr. Joshua Ballew

Session: Spring 2016

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Office: Office: WEH 7124

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Office Hours:

M 11:00 AM–12:00 PM, WR 3:00 PM–4:00 PM

Lecture Times: MWF 12:30 PM–1:20 PM

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Office Hours: TBA

Tutorial Times:	Room
(A) TR 10:30 AM–11:20 AM	BH 255A
(B) TR 4:30 PM–5:20 PM	WEH 4709

Textbook

Neuhauser, Claudia. *Calculus for Biology and Medicine*. Pearson: Prentice Hall, Boston, third edition, 2011. ISBN: 978-0321644688

Course Description

This is intended as a second calculus course for biology and chemistry majors. Some of the homework assignments will use a variety of computational techniques that involve the use of MATLAB or a similar system. Topics to be covered include integration: techniques and numerical integration; ordinary differential equations: techniques for solving ODEs and numerical methods; modeling with ODEs (e.g., infection, population models); linear algebra: matrices, complex numbers, eigenvalues, eigenvectors, and systems of ordinary differential equations; and probability: discrete and

continuum probability, conditional probability and independence, limit theorems, important distributions, and probabilistic models. It is expected students will have met the prerequisite requirement of 21-112 or 21-120.

Evaluation

Evaluation will be based upon three in-class exams, homework, groupwork from recitation, and a final exam. Specifically, each in-class exam will be worth fifteen percent of the overall grade, the final exam will be worth twenty-five percent of the overall grade, all the homework together will be worth fifteen percent of the overall grade, and all the groupwork from recitation will be worth fifteen percent of the final grade. The lowest homework grade and the lowest groupwork grade will be dropped. Any curving of grades will be based upon the final course grade; individual assignments and exams will not be curved.

Assignment Details

Homework will be assigned roughly weekly, and each assignment will be worth twenty points. Each assignment will contain problems from the book and possibly my own problems. I expect to post the coversheet as a PDF file on the course website and on Blackboard by 5:00 PM each Friday. Homework will be due at the BEGINNING OF CLASS on the due date, typically on Fridays. You must staple the coversheet to the top of your homework assignment or one point will be deducted. Late homework assignments will be accepted without a grade penalty only with a legitimate reason (illness, death in the family, religious observance, university-sponsored activity, etc.). Documentation may be required if there is an excessive number of late assignments. Late homework assignments must be turned into Dr. Ballew, not your TA. A selection of problems will be graded for correctness. Students may collaborate on homework assignments, but each student must submit his or her *own* work.

Exams will be given on the dates given in the course schedule. The material on each exam will be announced a week in advance; the sections indicated in the schedule are tentative. Make-up exams will be granted only for excused absences with documentation. Please inform me as soon as possible if you will miss an exam day so that alternate arrangements can be made. Each of the three in-class exams will be graded out of one hundred points. About half of the final exam will focus on the material covered after the third exam; the rest of the final exam will be cumulative.

Recitation/Discussion

Students are expected to attend their assigned recitation section each Tuesday and Thursday. Each

recitation section will have some time for questions on lecture material and homework problems, and the groupwork assignment each week. You will work in groups, but each student shall turn in his or her own assignment. There will be space on the worksheet to indicate the names of the students in your group. Groupwork assignments cannot be made up, but may be excused under appropriate circumstances.

Miscellaneous

Students are expected to abide by policies of academic integrity available at the web address `http://www.cmu.edu/academic-integrity/`. In particular, no assistance will be allowed on any of the exams unless otherwise stated: no crib sheets, copying, calculators, computers, phones, etc.

Students are also encouraged to get help from other classmates, from their TA, or from me when necessary. You are welcome at any time during office hours or you may make an appointment. Please place "21-124" in the subject line of any emails to me and allow 24 hours for a response.

It is expected that students will have read the section(s) for each lecture BEFORE class. It is not expected that you completely understand the material in each section before class, however. Please come with any questions you may have in case I do not address them during the lecture.

The lecture schedule on the following page is subject to change. Any changes will be announced in lecture.

Lecture Schedule

MONDAY	WEDNESDAY	FRIDAY
Jan 11th **1** Course Overview, Calculus I Review, 7.1	13th **2** 7.1, 7.2	15th **3** 7.3
18th No class–Martin Luther King, Jr. Day	20th **4** 7.4	22nd **5** 7.5
25th **6** 7.6	27th **7** 7.6	29th **8** 8.1
Feb 1st **9** 8.1, 8.2	3rd **10** 9.1	5th **11** Exam 1 (7.1-8.2)
8th **12** 9.2	10th **13** 9.3	12th **14** 9.3
15th **15** 9.4	17th **16** 10.1, 10.2	19th **17** 10.2
22nd **18** 10.3	24th **19** 10.4	26th **20** 10.6
29th **21** 11.1	Mar 2nd **22** Exam 2 (9.1-10.6)	4th No class–Mid-Semester Break
7th No class–Spring Break	9th No class–Spring Break	11th No class–Spring Break
14th **23** 11.1, 11.2	16th **24** 11.2	18th **25** 11.3
21st **26** 11.3, 11.4	23rd **27** 11.4	25th **28** 12.1
28th **29** 12.1	30th **30** 12.2	Apr 1st **31** Exam 3 (11.1-12.1)
4th **32** 12.3	6th **33** 12.4	8th **34** 12.4
11th **35** 12.5	13th **36** 12.5	15th No class–Spring Carnival
18th **37** 12.6	20th **38** 12.6	22nd **39** 12.7
25th **40** 12.7	27th **41** Review	29th **42** Review