Calculus for biological sciences II – Math 247
Syllabus and guidelines 2009-2010
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Text: *Calculus for Biology and Medicine*, by Claudia Neuhauser, 2nd edition. We will cover roughly chapters 6, 7 and 8.

Exams: There will be 2 midterms at the end of week 4, and at the end of week 8. There will be a two hour final exam at the time scheduled by the registrar's final exam calendar.

Quizzes: We will also have 3-4 quizzes (usually on Fridays).

Problem Sets: There will be (mostly) weekly homework assignments, Homework will usually be due on Wednesday. We will usually devote Tuesdays to problem solving.

Grades: Each hour exam will count as 20% of your grade, the total homework will count as 20% of your grade, the total quizzes will count as 10%, and the final exam will count for 30%.

The students are expected to have a working knowledge of Math 246 (or Math 251). This class will be much easier if you spend some time in advance refreshing your memory about differentiation.

It is extremely important to study the relevant part of the text *before* the related lecture. This will make lectures easier to understand and give you a chance to ask questions that come up reading the text.

Doing the homework seriously is the most important thing you can do to succeed in this course. Start early, and do some every day. I encourage you to work together on homework, as long as the work you do is really your own.

Please do ask questions about the homework, or any other aspect of the course in class. I will always be happy to spend the first few minutes of class dealing with homework questions, or questions from previous lectures, so come prepared! In order to ask questions effectively, make notes to yourself as you review lectures (and discover points that are unclear to you), as you study the text (and notice things that you are not sure you understand), and as you work on homework and come to problems you have trouble with.

Approximate Schedule

Week 1: The Area problem and definite integral as a limit of Riemannian sums. 6.1.

Week 2: Indefinite integral and the fundamental theorem of calculus. 6.2.

Week 3: Applications of integration: areas, volumes, work, average values. 6.3.

Week 4: The substitution rule. 7.1.

Week 5: Integration by parts. 7.2.

Week 6: Integration of rational functions. 7.3.

Week 7: Improper integrals. 7.4.

Week 8: Approximate integration. 7.5-7.6.

Week 9: Differential equations. 8.1.

Week 10: Review.

Course Goals

Main goal of this class is to understand the idea of integral and learn techniques for basic computations (substitution rule, integration by parts, partial fractions). It is important to explain geometric and physical interpretations of integral. In the end an idea of differential equations is given.

Potential Problems:

(1) Algebra background. A lot of the students in this course will have insufficient algebra background. Many of them can catch up, but they'll have a real slog, and will have to spend way more time on homework than the 8-9 hours per week that I expect from everyone. They have trouble with things like factoring polyonmials and sim- plifying rational expressions. This makes it hard for them to do things like integration of rational functions. Many students will need to be reminded about trigonometric identities which used in integration of trigonometric expressions. For various area problems one needs to sketch curves given analytically; this also could be difficult for some students.

(2) Some students will take this class long time after they took Math 246. Again, they can catch up but this will require some time investment from them.