



Math 148 - Spring 2013

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Office: Blocker 638
 Office hours: Mon 1pm-2pm, Tue 4pm-5pm
 Wednesdays 10am-12pm
 and by appointment

<u>Section</u>	<u>Days</u>	<u>Time</u>	<u>Location</u>
501, 502, 503 Lecture	TR	11:10am-12:25pm	BLOC 166
501 Recitation	MW	1:50pm-2:40pm	BLOC 148
502 Recitation	MW	3:00pm-3:50pm	BLOC 148
503 Recitation	MW	4:10pm-5:00pm	C E 223
Class Times and Locations:			
504, 505, 506 Lecture	TR	9:35am-10:50am	BLOC 166
504 Recitation	MW	12:40pm-1:30pm	BLOC 164
505 Recitation	MW	1:50pm-2:40pm	ZACH 119D
506 Recitation	MW	3:00pm-3:50pm	ZACH 119D

Required Text: *Calculus for Biology and Medicine*, Third Edition, by Claudia Neuhauser, Pearson (2010). ISBN: 9780321644688

Catalog Title and Description: (CREDIT 4.0) *Calculus II for Biological Sciences* - Introduction to integral calculus in a context that emphasizes applications in the biological sciences; ordinary differential equations and analytical geometry. Prerequisite: MATH 147 or approval of instructor. **Credit will not be given for more than one of MATH 148, MATH 152 and MATH 172.**

Course Goal: The goal of this course is to introduce students to integral calculus and differential equations in a context that emphasizes applications in the biological sciences. Second semester topics will include integration techniques and applications; solving systems of ordinary differential equations; topics in linear algebra and analytic geometry; functions of several variables, differentiability, and applications; and solving systems of difference equations. Note: A tentative schedule for this course, including the topics to be taught, can be found on my web page. A brief summary of the lecture schedule is given at the end of this syllabus.

Learning Outcomes: During the course of MATH 148, students will gain the following specific knowledge and skills and will

- learn techniques for integration, including integration by parts and partial fraction decomposition.
- be able to identify and compute improper integrals using limits.
- be able to justify why an improper integral converges or diverges by applying the comparison theorem.
- be able to approximate functions with Taylor polynomials and evaluate the error in the approximation by using the Taylor inequality.
- be able to solve separable ordinary differential equations.

- understand how exponential population growth is modeled by a constant per capita growth rate while logistic population growth incorporates density dependence.
- be able to find equilibria of differential equations and analyze their stability both graphically and by using the stability criterion.
- learn techniques for solving systems of equations, including Gaussian elimination.
- learn basic matrix algebra skills including addition, subtraction, scalar multiplication, and multiplication of matrices and finding the inverse of a matrix and be able to apply them to solve problems.
- be able to compute and interpret eigenvalues and eigenvectors for 2×2 matrices.
- be able to use matrices in biological applications, including the study of age-structured populations.
- be able to interpret 2×2 linear maps applied to 2×1 vectors.
- be able to add, subtract, and scale vectors and compute dot products.
- use vectors in applications, including finding equations of lines and planes.
- know concepts of limits and continuity for multivariable functions.
- be able to use partial derivatives and linear approximations for solving real-world problems.
- learn the concepts of equilibria and stability for biological systems of difference equations.
- be able to correctly solve applied problems, and write the solutions in a coherent fashion.
- have knowledge of linear and nonlinear systems of differential equations applied in biology and medicine.

Email Policy: Check your TAMU email account EVERY day. You are responsible for any information I send via email. If you send an email to me, be sure to include your full name and section number in the message. NOTE: Because of privacy rights, I cannot discuss grades via email or over the phone.

Cell Phone/Laptop Computer Policy: As a courtesy to me and your classmates, all cell phones and laptop computers (and other electronic devices) must be OFF and put away during lecture. If you disrupt class or distract your neighbor **or distract me** with your cell phone or other electronic device, you may be asked to leave class.

Grading Policy: Grades will be calculated according to the following percentages:

Three Evening Exams	18% each	A = 90-100%
Quizzes	15%	B = 80-89%
Recitation Assignments	8%	C = 70-79%
Comprehensive Final Exam	23%	D = 60-69%
		F = below 60%

Note: Any questions regarding grading/scoring must be made **within one week** of the return of the exam or quiz or no change in the grade will be made.

Make-up Policy: No make-ups will be given without written evidence of an official University excused absence. (See *University Student Rules*.) According to Section 7.3 of the *University Student Rules*, for an absence to be considered excused,

the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance

notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class.

If no such notice is given, the rights to a make-up are forfeited. In addition (and also in accordance with *University Student Rules*), a **written** excuse must be presented upon return to class. Specifically, in the case of illness or injury, students are required to obtain a confirmation note from a health care professional affirming date and time of a medical office visit regarding the illness or injury. I will NOT accept the Explanatory Statement for Absence from Class form as sufficient written documentation of an excused absence.

Exams: There will be three **evening** exams on the dates listed below, each from **7:30pm-9:30pm**, and a comprehensive final, scheduled as shown below. I will **NOT** curve test grades, but if your score on your comprehensive final exam is greater than your lowest score on the first three exams, then I will replace your lowest exam score with the score earned on the final exam. Only one grade replacement is possible.

<u>Tentative Exam Schedule</u>	<u>Final Exam</u>
Exam 1 : Thursday, Feb. 14	Sections 501, 502, 503: Friday, May 3, 3pm-5pm
Exam 2 : Thursday, Mar. 21	Sections 504, 505, 506: Friday, May 3, 12:30pm-2:30pm
Exam 3 : Tuesday, Apr. 23	

Quizzes: Announced and unannounced quizzes and will be given throughout the semester during Wednesday recitations and occasionally during lecture. Each quiz will be graded on a 10-point scale, and **no make-up quizzes will be given without written verification of a University excused absence.** One quiz grade will be dropped.

Recitation Assignments: A set of problems will be assigned during recitation each Monday and will be due during that class period. Students may work on these problems in groups of up to three. These assignments will be graded on a 10-point scale, and since only the best 8 scores will be used to obtain the recitation assignment average, no make ups will be allowed for missed recitation assignments.

Homework Assignments: Homework assignments will be posted on the course website. These assignments will not be collected for a grade, but completing them is essential to doing well in the course.

Attendance: I **STRONGLY** suggest that you make every attempt to not miss a single day of lecture or recitation. Falling behind in this course can be very detrimental to your grade.

Calculator Policy: Students will be allowed to use a scientific calculator on most quizzes and exams, with potentially a few exceptions. No graphing calculators, cell phone calculators, or any other electronic device will be allowed.

Scholastic Dishonesty: You are encouraged to work together on the homework assignments, but do not copy another student's work. Copying work done by others, either in class or out of class, is an act of scholastic dishonesty and will be prosecuted to the full extent allowed by University policy. Using an unauthorized calculator during an exam or quiz will result in a zero on the assignment. Also, cell phone use during an exam, quiz, or recitation assignment will result in a zero on the assignment. Always abide by the Aggie Code of Honor: *An Aggie does not lie, cheat, or steal or tolerate those who do.* Please refer to Honor Council Rules and Procedures at <http://www.tamu.edu/aggiehonor> for more information on academic integrity and scholastic dishonesty. **I have served as a member of the Aggie Honor Council, so I take these matters very seriously.**

Extra Help and Preparing for Exams:

- **Your Instructor:** I want each and every one of my students to be successful in this class. Please feel free to ask questions in class. If you need more help, come by my office during office hours or make an appointment to see me. Remember, I am here to help, but I cannot do that if I don't know that there is a problem.
- **Recitation and TA:** You will attend recitation with a teaching assistant twice per week. During these class periods, you will be able to ask the TA to explain homework problems and review any topics from lecture, so be sure to take advantage of this class time.
- **Your Classmates:** Get to know your classmates. Form study groups and work on suggested problems outside of class.
- **Practice:** Working ALL of the suggested homework problems from your textbook is essential to doing well in this course. If you struggle with these problems the first time you work them, be sure to work them again AND work other problems from the textbook that are similar. I strongly recommend that you practice problems **DAILY**.
- **Free Tutoring!!! (a.k.a. Help Sessions):** Help sessions are an opportunity for you to ask questions and get help with your homework. The schedule for spring help sessions can be found on my webpage. These sessions are come-and-go, i.e., you can come at any point during the help session and leave whenever you want.

ADA Policy Statement: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room B118 of the Cain Hall or call 845-1637.

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Weekly Lecture Schedule: Roughly speaking, we should cover the following material from the textbook by Neuhauser on the following schedule:

<u>Week of Monday</u>	<u>Sections Covered</u>	<u>Week of Monday</u>	<u>Sections Covered</u>
Jan. 14	7.2, 7.3	Mar. 18	10.4
Jan. 21	7.3, 7.4, 7.6	Mar. 25	10.5.1, 10.6.1
Jan. 28	7.6, 8.1	Apr. 1	10.6.1, 10.7
Feb. 4	8.1, 8.2	Apr. 8	11.1, 11.2
Feb. 11	9.1	Apr. 15	11.3
Feb. 18	9.2, 9.3	Apr. 22	11.4
Feb. 25	9.4, 10.1, 10.2	Apr. 29	Review
Mar. 4	10.2, 10.3		