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MA 138: Calculus II for Life Sciences, Fall 2014   MA 109: College Algebra, Fall 2014

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Syllabus

MA 138: Calculus II for Life Sciences, Fall 2014

Time & Place

Monday, Wednesday and Friday from 8:00 am to 8:50 am in CB 341,
as well as Tuesday and Thursday from 8:00 am to 8:50 am in CB 349
(too much calculus for just one room).

Clinton Hines, Instructor

Office:	805 Patterson Office Tower
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Phone:	859-257-4874
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Office Hours

Tuesdays, Wednesdays and Thursdays 10:00 - 11:00 in POT 805
as well as Thursday at 9:00 in the Mathskeller, meetings also by appointment

Course Overview

In Calculus II for the life sciences, we will learn about methods for evaluating integrals, differential equations and the first elements of calculus in several dimensions. Differential equations serve to model quantities which change over time such as biological populations. The computational techniques for integrals are needed to be able to find exact solutions to these equations. Calculus in several dimensions is useful for understanding quantities which vary with respect to position and time. Examples that will illustrate these mathematical techniques include systems of differential equations which model two species interacting in nature.

Course Outline

1. **Chapter 6: Integration**

    Review

    Applications of integration

2. **Chapter 7: Integration techniques and computational methods**

    The substitution rule

    Definite integrals

    Integration by parts

    Partial fractions

    Improper integrals

3. **Chapter 8: Differential equations**

    Solving differential equations

    Equilibria and their stability

4. **Chapter 9: Linear algebra and analytic geometry**

    Linear systems

    Matrices

    Linear maps, eigenvectors and eigenvalues

    Curve fitting - least squares approximation

5. **Chapter 10: Multivariable calculus**

    Functions of two or more variables

    Limits and continuity

    Partial derivatives

    Tangent planes, differentiability and linearization

    Systems of difference equations

6. **Chapter 11: Systems of differential equations**

    Linear systems: theory

    Nonlinear autonomous systems: theory

    Nonlinear systems: applications

Student Learning Outcomes

Students will compute fluently. Students will write correct justifications for their solutions to problems. Students will apply the methods of calculus in new contexts to solve unfamiliar problems.

Course Objective

This course is intended to prepare students of life sciences for useful mathematics in their chosen fields of research. Students will learn techniques of integration and differential equations, as well as geometry and differential calculus in several dimensions. Further, students must demonstrate the use of these mathematical tools to analyze and solve problems relating to the biological sciences.

Grading

The final grade scale is (in percentages): $100 \geq A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > E$.

Exams (4 total including final)	80%
WeBWork assignments (27 total)	8%
Written Homework (20 total)	8%
Attendance	4%
Project (optional)	4%

Exams

Exam 1	Tuesday, Sept 23, 5:00 - 7:00 pm in CP 153	Chapters §6 and §7
Exam 2	Tuesday, Oct 21, 5:00 - 7:00 pm in CP 153	Chapters §8 and §9
Exam 3	Tuesday, Nov 18, 5:00 - 7:00 pm in CP 153	Chapter §10
Final	Wednesday, Dec 17, 6:00 - 8:00 in CB 212	Cumulative

Homework Policy

The online homework is hosted by WeBWorK. For preferences regarding all online and written homework protocols please consult homework. In particular, written homework will be collected at the start of class on the dates listed and late homework will not be accepted without a verified university approved absence (see excused absences below).

Attendance

Students are expected and required to attend and participate in class. Each unexcused absence in excess of 3 will result in a loss in one percent of the final letter grade.

Excused Absences

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students are expected and required to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: http://www.uky.edu/Ombud. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited. Part II of Student Rights and Responsibilities (available online http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-
2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Comments

You do not have permission to add comments.