Mathematics 2210, Sections 1 and 2   Calculus III   Fall 2019

Class Time and Place:
2210−001, MWF, 9:40−10:30, JTB 130
2210−002, MWF, 10:45−11:35, JTB 140

Instructor: Ken Golden, Distinguished Professor of Mathematics
LCB 328, 801-581-6176 (office), 801-750-8555 (mobile)
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website: www.math.utah.edu/∼golden

Course Credit Information: Math 2210 Calculus III is a 3 credit course.

Prerequisite Information: "C" or better in (MATH 1220 OR MATH 1250 OR MATH 1320) OR AP Calculus BC score of at least 4.

Office Hours: Mondays 11:45 AM – 12:45 PM, by appointment, or most days after class.

Text: *Calculus with Differential Equations, 9th Edition*, Varberg, Purcell and Rigdon
For information on purchasing the textbook: www.math.utah.edu/schedule/bookInfo/

Course Materials: Practice exams, the syllabus, help schedules, etc. can be obtained at www.math.utah.edu/∼golden.

Course Description: Mathematics 2210 is an introduction to multivariable calculus. Vectors, functions, and motion in two and three dimensional space will be examined. Derivatives and integrals of functions of many variables will be developed. The fundamental differential operators of calculus in higher dimensions, **div**, **grad**, and **curl**, and their physical interpretations for fluid and electromagnetic fields, will be studied in detail. Integration of functions on curves, surfaces, and volumes will be developed. The course will conclude with an introduction to vector field theory and the theorems of Green, Gauss, and Stokes.

Teaching Assistant (TA):
Ryleigh Moore, rmoore@math.utah.edu, 801-581-5337, JWB 226.
Ryleigh will not be available from approximately Sept. 12th - Nov. 1st because she will be a member of the MOSAiC School on an Arctic expedition.

Learning and Teaching Assistant (LA/TA):
Delaney Mosier, delaney.mosier@gmail.com, u1136453@utah.edu.

Discussion Hours:

There will be optional help sessions conducted by the course assistants. During these sessions you can get help with webwork problems, exams, etc. Schedule of times and places will be posted.

Getting Help:

- **Using WeBWorK:** You will access the webwork system through your Canvas login. In class we will briefly go over how the webwork system works. If you encounter any problems, please contact TA Ryleigh Moore, and give your full name, course number and section, and student ID number.

- **Webwork Feedback Button:** When you use the feedback button within an exercise, state your question clearly. All relevant data about your question and answer attempts are sent to your course assistant. Please don't over-use this option.

- **Tutoring Center & Computer Lab:** There is free tutoring in the T. Benny Rushing Mathematics Student Center (Room 155, the lower level between JWB and LCB), as well as a computer lab. For more information see http://www.math.utah.edu/undergrad/mathcenter.php

- **Private Tutoring:** University Tutoring Services, 330 SSB. There is also a list of tutors in the math department office JWB 233.

- **Departmental Videos:** The math department has a full set of lecture videos which you are welcome to use to supplement our course material. These can be found at http://www.math.utah.edu/lectures/

Grades and Exams:

- (50%) Your two best scores on three in-class exams. The lowest of your three exam scores is dropped automatically in calculating the final grades. There are NO MAKE-UP EXAMS. You may bring one sheet of paper and a calculator to any exam, but NO laptops or wireless devices. Please bring University ID to all exams.

- (25%) Final exam.

- (25%) WeBWorK assignments.

Course Outline:

August	19-23	11.1-11.3	Vectors and the geometry of space	
	26-30	11.4-11.7	Motion and vector-valued functions	
September	3-6	11.8-11.9	Surfaces; coordinate systems	
	9-13	12.1-12.4	Derivatives of multivariable functions	
	16-20	12.5-12.6	Directional derivatives and the gradient	EXAM I (Sept. 20)
	23-27	12.7-12.9	Tangent planes; maxima and minima	
	30-4	13.1-13.3	Double integrals	
October	7-11		FALL BREAK	
	14-18	13.4-13.6	Surface area; applications	
	21-25	13.7-13.8	Triple integrals	EXAM II (Oct. 25)
	28-1	13.9	Change of variables in multiple integrals	
November	4-8	14.1-14.2	Vector fields and line integrals	
	11-15	14.3-14.4	Green's Theorem and path independence	EXAM III (Nov. 15)
	18-22	14.5-14.6	Gauss's Theorem and surface integrals	
	25-27	14.7	Stokes's Theorem	
December	2-5		Partial differential equations of science	
	9-13			FINAL EXAMS

FINAL EXAM SCHEDULE:
2210-001: Thursday, December 12, 8:00 AM – 10:00 AM, JTB 130
2210-002: Monday, December 9, 10:30 AM – 12:30 PM, JTB 140

Expected Learning Outcomes: Upon successful completion of this course, a student should be able to:

1. Perform basic vector computations, as well as dot and cross products of two vectors and projection of one vector onto another vector.

2. Convert between cylindrical, rectangular and spherical coordinates. Understand when it's prudent to switch to one coordinate system over another in computing an integral.

3. Determine the equation of a plane in 3-d, including a tangent plane to a surface in 3-d.

4. Find the parametric equations of a line in 3-d.

5. Perform calculus operations on functions of several variables, including limits, partial derivatives, directional derivatives, and gradients; understand what the gradient means geometrically.

6. Find maxima and minima of a function of two variables; use Lagrange Multipliers for constrained optimization problems.

7. Understand divergence and curl of a vector field.

8. Compute double and triple integrals in rectangular, spherical and cylindrical coordinates; proper use of double or triple integrals for finding surface area or volume of a 3-d region.

9. Compute line and surface integrals.

10. Determine if a vector field is conservative and if so, find the corresponding potential function.

11. Use and understand when to apply Green's Theorem, Gauss' Divergence Theorem and Stokes Theorem.

Student Responsibilities: All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, and I will do so, beginning with verbal warnings and progressing to dismissal from and class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee. http://regulations.utah.edu/academics/6-400.php

ADA Statement: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which Includes sexual orientation and gender identity/expression) is a civil rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veterans status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

Student Names and Personal Pronouns: Class rosters are provided to the instructor with the students legal name as well as Preferred first name (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise me of any name or pronoun changes (and update CIS) so I can help create a learning environment in which you, your name, and your pronoun will be respected. If you need assistance getting your preferred name on your UIDcard, please visit the LGBT Resource Center Room 409 in the Olpin Union Building, or email bpeacock@sa.utah.edu to schedule a time to drop by. The LGBT Resource Center hours are M-F 8am-5pm, and 8am-6pm on Tuesdays.

Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a students ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at www.wellness.utah.edu or 801-581-7776.

Safety Statement: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu.