

Syllabus for Math 2210-002

Calculus III, Spring 2021

General Course Information:

Course: Math 2210 - Calculus III.

Instructor: Keyvan Yaghmayi.

Email: yaghmayi@math.utah.edu.

Office: JWB 104.

Course Website: We use Canvas: <https://gate.acs.utah.edu/>. To log in, use the same student ID and password that you use for Campus Information System.

Class Time: Mondays, Wednesdays, and Fridays 8:35am - 9:25am.

Class Location: Online lectures in Canvas via Zoom. Links are available in Canvas.

Course Type: The class type is listed as an “IVC” in the university catalog, which stands for “Interactive Video Conferencing”. This means that the class will be delivered synchronously, i.e. live and at the time listed but entirely online.

Office Hours: I will hold online office hours via Zoom in Canvas. Every Monday 10:00am - 11:00am and every Thursday 2:00pm - 3:00pm, or by appointment. The Zoom link is available in Canvas.

Textbook: Calculus, with Differential Equations, by Varberg, Purcell, and Rigdon, 9th edition published by Pearson. ISBN-10: 0132306336 — ISBN-13: 978-0132306331. Before buying the textbook, please read “Calculus Textbook Information” file on Canvas or visit <http://www.math.utah.edu/schedule/bookInfo/CalcBookInfo.pdf>. Any 9th edition book is fine.

Important Dates: Classes begin Tuesday, January 19. The last day to add, drop, or audit classes is Friday, January 29. The last day to withdraw is Friday, March 12. Last day to reverse CR/NC option is Friday, April 23. *Final Exam* is on Friday, April 30, 8:00am - 10:00am, in Canvas.

Technical requirements: For both quality learning and proctored testing, students are required to have access to the following equipment:

- A strong internet connection with sufficient bandwidth (in order to participate in online classes, access course materials, and take exams)

- A webcam on your computer or camera on your phone (this is required for taking exams in Zoom; it is recommended for IVC lecture classes)
- A scanning device (smartphones can be used as scanning devices)
- a microphone (used for online meetings)

Note: The Marriott library is loaning laptops to students. They are also offering off-campus internet access. Please visit <https://lib.utah.edu/coronavirus/checkout-equipment.php>

Essential Course Information:

Prerequisites: “C” or better in (MATH 1220 OR MATH 1250 OR MATH 1320) OR AP Calculus BC score of at least 4.

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

Course Description: Vectors in the plane and in 3-space, differential calculus in several variables, integration and its applications in several variables, vector fields and line, surface, and volume integrals. Green’s and Stokes’ theorems.

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

1. Compute dot and cross products of two vectors, 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.

Course Roadmap Week-by-Week: Below is an outline and rough schedule of the sections and topics that we will cover in this course:

- Week 1:* 10.4 Parametric Representation of Curves in the Plane, 11.1 Cartesian Coordinates in Three-Space. **Monday, January 18 is Martin Luther King Day Holiday.**
- Week 2:* 11.2 Vectors, 11.3 The Dot Product, 11.4 The Cross Product. **Note: Friday, January 29 is the last day to drop.**
- Week 3:* 11.5 Vector-Valued Functions and Curvilinear Motion, 11.6 Lines and Tangent Lines in Three-Space, 11.8 Surfaces in Three-Space.
- Week 4:* 11.9 Cylindrical and Spherical Coordinates, 12.1 Functions of Two or More Variables, 12.2 Partial Derivatives.
- Week 5:* 12.3 Limits and Continuity, 12.4 Differentiability. **Monday, February 15 is Presidents' Day Holiday.**
- Week 6:* 12.5 Directional Derivatives and Gradients, Review for Midterm 1. **Note: Midterm 1 is on Friday, February 26, on Material covered in Weeks 1-5.**
- Week 7:* 12.6 The Chain Rule, 12.7 Tangent Planes and Approximations. **Friday, March 5 is Non-Instructional Day Holiday.**
- Week 8:* 12.8 Maxima and Minima, 12.9 The Method of Lagrange Multipliers, 13.1 Double Integrals over Rectangles. **Note: Friday, March 12 is the last day to withdraw.**
- Week 9:* 13.2 Iterated Integrals, 13.3 Double Integrals over Nonrectangular Regions, 13.4 Double Integrals in Polar Coordinates.
- Week 10:* 13.6 Surface Area, 13.7 Triple Integrals in Cartesian Coordinates.
- Week 11:* 13.8 Triple Integrals in Cylindrical/Spherical Coordinates, Review for Midterm 2. **Note: Midterm 2 is on Friday, April 2, on Material covered in Weeks 6-10.**
- Week 12:* Continue 13.8 Triple Integrals in Cylindrical/Spherical Coordinates, 13.9 Change of Variables in Multiple Integrals, **Monday, April 5 is Non-Instructional Day Holiday.**
- Week 13:* 14.1 Vector Fields, 14.2 Line Integrals, 14.3 Independence of Path.
- Week 14:* 14.4 Green's Theorem in the Plane, 14.5 Surface Integrals, 14.6 Gauss's Divergence Theorem. **Note: Friday, April 23 is the last day to reverse CR/NC option.**
- Week 15:* 14.7 Stokes's Theorem, Review for the Final Exam. **Note: Classes end on Tuesday, April 27. Final Exam is on Friday, April 30, 8:00am - 10:00am. It is Comprehensive.**

Modules: To be organized, I will create "Modules" in Canvas for every week. The module is going to have four parts: (1) class notes (2) lecture videos (3) announcements and discussions (4) homework assignments and quizzes (and exams).

Homework:

Homework problems and due dates will be posted on Canvas regularly. The problems will be taken from the book. You should write them on paper, scan and create a single PDF file of your work, then upload it into the Canvas. Please scan and don't take photo. You don't need a scanner; there are directions in Canvas for using your smart phone as scanner. Scanning is easier and faster than taking pictures. The quality is higher than pictures too.

I encourage you to discuss your homework problems with one another, ask help from tutors in the *online math center* (see below), or talk to me during online office hours. The other way that you can get help with homework assignments (and quizzes) is posting discussions in Canvas.

I will drop your lowest homework score at the end of the semester. Your homework assignments will be graded in Canvas.

Quizzes:

We will have take-home (group) quizzes on the material that already has been taught and covered by homework assignments. I will make quizzes available by Wednesdays 11:59pm and they are due Fridays at 11:59pm. You print, answer questions, scan and upload the PDF file into Canvas (there are directions on Canvas for those who don't have access to printer and/or scanner). There will be 2-3 questions in every quiz. Your quizzes will be graded in Gradescope.

You are encouraged to work on quizzes within small groups of 3 or 4. You would discuss your possible solutions within the group and then write your answer based on your own understanding. Working in groups is encouraged, but it is "individual responsibility" to complete and submit quizzes. Everyone writes only his/her name on the quiz paper. At the end of the semester, I will drop your lowest quiz score.

Tests:

There will be two midterms along with a "comprehensive" final exam. All exams are during class time. I will provide you exam file in Canvas and proctor you through the Zoom.

Exam One: Friday, February 26, 8:35am-9:25am, on Material covered in Weeks 1-5

Exam Two: Friday, April 2, 8:35am-9:25am, on Material covered in Weeks 6-10

Final Exam: Friday, April 30, 8:00am-10:00am, comprehensive

It is essential that you show all your work. Credit will not be given without the proper work and partial credit will be awarded if you show correct steps even if you do not obtain the final correct number.

Grading:

The grades will be calculated as follows:

Homework 20%

Midterm 20%

Final Exam 20%

Quizzes 20%

Midterm 20%

The grade scale will be the usual: A (93-100), A- (90-92), B+ (87-89), B (83-86), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D+ (67-69), D (63-66), D- (60-62), E (0-59). If I do need to curve the grades, I will simply shift your overall percentage up by a few points (whatever is necessary).

Tutoring and Extra Help:

- **Math Student Center:** The online math tutoring center is available free of charge to all university students. The tutoring center is open Monday-Thursday 8:00am-8:00pm, and Friday 8:00am-6:00pm. Please take advantage of the tutoring center as needed throughout the semester. Their website is: <http://www.math.utah.edu/undergraduate/mathcenter.php>
- **ASUU Learning Center:** Home of tutoring services here at the University of Utah. If you need help understanding course content or want to develop better strategies for academic success, then check out their website: <http://tutoringcenter.utah.edu>. They offer inexpensive (online) tutoring.
- **Department of Mathematics Lecture Videos:** They have put together a complete set of lecture videos for several classes, including Calculus III. You can find them here: <http://www.math.utah.edu/lectures/>
- **Khan Academy:** It is a non-profit, free, educational organization for anyone, anywhere. They have some amazing videos in the Youtube. If you're interested, check out: <https://www.khanacademy.org/>

Some Policies and Comments:

- Please check Canvas regularly (every day or every other day). I will use the following features of Canvas frequently: Pages, Assignments, Zoom, Announcements, Modules, Discussions, Gradescope, Files, and Grades.
- **Late and Missing Assignments Policy:** The course is designed to provide flexibility in the case of a few times. But in general, you are expected to turn things in on time and take quizzes and exams at the times given. If there are extenuating circumstances, please contact me in a timely way to discuss alternatives. If the situation is one that can be documented, you may be asked to provide documentation. The University of Utah student code allows for making up quizzes or exams in advance for “officially sanctioned University activities, or government obligations, or religious obligations”. Please contact me at least one week in advance of any such obligations to arrange accommodation.
- For quizzes and exams, you are allowed to use a “scientific calculator”. Other types of calculators like programmable calculators or graphing calculators are not allowed. I will make tests and quizzes to evaluate your mathematical skills and not your calculator skills. For homework assignments, it is okay that you check your answer by advanced calculators or other preferred technology.
- Past semesters, with take-home quizzes and online exams, there was an increase in instances of cheating and other types of academic misconduct. Many online tutoring and video hosting sites, as part of their terms of service, are authorized to fully cooperate with investigations involving academic integrity. All cases involving cheating will be handled according to standard protocols in the Code of Student Rights and Responsibilities. See Policy 6-400 <http://regulations.utah.edu/academics/6-400.php>.
- If there is something that I want to inform you, I will reach out to you by emailing you through Canvas. That is usually your default UMail address (uNID@utah.edu) that you have in the CIS. If you are using other emails more frequently than your UMail, then you can set your UMail to forward to your preferred email address. Also the fastest way to reach me is my email: yaghmayi@math.utah.edu.
- If your preferred name is different than your legal first name (the preferred name you chose does indeed show up in CIS on my roll sheet, but not yet in Canvas), please log into Canvas and go to “Account” (on far left) then “Settings” and change your “Display Name” to be the name you prefer to be addressed by. This will help me greatly to know students’ names, and to address you correctly when responding to Canvas comments.

- Online attendance to live lectures is strongly encouraged but not required. **Class lectures will be recorded and posted in Canvas.**
- All materials for this course are copyrighted. Do not distribute or share course resources without instructor permission.
- If you have any thoughts, ideas, or suggestion, please feel free to contact me. I promise to do everything in my power to help.

COVID-19 Considerations:

- Generally, on-campus, all of us should wear a face covering mask and we should also maintain a 6 ft. distance between ourselves while using community rooms and common areas in buildings.
- We must self-report if we test positive for COVID-19 via <https://coronavirus.utah.edu/>.
- Spring break was originally scheduled to run March 7th - March 14th, but has since been canceled. There is no “Spring Break” this semester.

University of Utah Resources and Policies:

- **Center for Disability & Access:** is dedicated to students with disabilities by providing the opportunity for success and equal access at the University of Utah. They are committed to providing reasonable accommodations as outlined by Federal and State law. The Center for Disability & Access (CDA) also strive to create an inclusive, safe and respectful environment. By promoting awareness, knowledge and equity, they aspire to impact positive change within individuals and the campus community. Please visit <http://disability.utah.edu/> for the latest information.
- **A.D.A. 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.

- **Campus Safety:** 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 <https://safeu.utah.edu/>.
- **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. You 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, collusion, fraud, theft, etc. Students should read the Code carefully and know you are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from 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>
- **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 U-ID card, 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.

- **Veterans Support Center:** The Center is staffed by student Veterans who are committed to providing their fellow Veterans with the most useful and current information available. The Mission of the Veteran Support Center is to improve and enhance the success of student Veterans; to help them receive the benefits they deserve; to serve as a liaison between the Veteran student community and the University; and to increase their academic success. Additionally to provide an opportunity to continue the relationships built through the service in civilian life. Please see <https://veteranscenter.utah.edu/>
- **Wellness Statement:** Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness at <https://wellness.utah.edu/> or 801-581-7776.
- **Women's Resource Center:** The Women's Resource Center (WRC) at the University of Utah serves as the central resource for educational and support services for women. Honoring the complexities of women's identities, the WRC facilitates choices and changes through programs, counseling, and training grounded in a commitment to advance social justice and equality. <https://womenscenter.utah.edu/>

Disclaimer: This syllabus is meant to serve as an outline and guide for our course. All information on this syllabus is subject to change. If any changes on this syllabus, course policies or course outline arise throughout the semester, then I will announce it in class and post it on Canvas.