Math 2531: Calculus 3
TTR, 3:00pm-4:45pm
Remote-Scheduled Course

Instructor: Andy Taylor

Contents

1 Office and Contact Information:

Office: A-123B
Office Phone: 505-925-8607
Email: ataylor19@unm.edu

Please note that email is the best way to contact me. Office/tutoring hours will be held virtually through Zoom.

2 Office Hours:

These will be held via Zoom, with the link to be posted in Blackboard under 'Office Hours'. Office hours will be accessible during these times:

12:00pm-2:30pm Monday/Wednesday, or by appointment

Please plan to regularly check into my office hours (tutoring hours). The purpose of this is to increase your accountability for the course, and for me to give you more immediate feedback on questions you may have, as well as your current status in the course. Also, the secret phrase is *'I can do this'*.

3 Overview

Welcome to Math 2531! Here is the UNM course description:

> Vector operations, vector representation of planes and curves, functions of several variables, partial derivatives, gradient, tangent planes, optimization, multiple integrals in Cartesian cylindrical and spherical coordinates, vector fields, line integrals and Greenâs theorem. (I)
>
> **Prerequisites/placement**: Prerequisite: C or better in Math 1522.

Please note: This syllabus is subject to change, as needed by the instructor.

4 Student Learning Outcomes (SLOs)

At the completion of this course students will be able to:

1. **Vectors and the Geometry of Space**

   (a) Write component form of a vector; perform vector operations and interpret results geometrically; write a vector as a linear combination of standard unit vectors.

   (b) Understand the three-dimensional rectangular coordinate system; analyze vectors in space.

   (c) Use properties of dot product of two vectors to find the angle between vectors, the direction cosines of a vector in space, the projection of one vector onto another vector, and the work done by a constant force.

   (d) Find the cross product of two vectors in space, and use the triple scalar product of three vectors in space.

   (e) Write a set of parametric equations for a line in space; write a linear equation to represent a plane in space; sketch the plane given by a linear equation; find the distances between points, planes, and lines in space.

   (f) Recognize and write equations of cylindrical surfaces, quadric surfaces, and surfaces of revolution.

2. **Vector-Valued Functions**

   (a) Analyze and sketch a space curve given by a vector-valued function.

   (b) Extend the concepts of limits and continuity to vector-valued functions. Differentiate/integrate a vector-valued function.

   (c) Describe the velocity and acceleration associated with a vector-valued function.

   (d) Use a vector-valued function to analyze projectile motion.

   (e) Find a unit tangent vector and a principal unit normal vector at a point on a space curve; find the tangential and normal components of acceleration.

   (f) Find the arc length of a space curve; use the arc length parameter to describe a plane curve or space curve; find the curvature of a curve at a point on the curve.

3. **Functions of Several Variables**

   (a) Understand the notation for a function of several variables; sketch the graph, level curves/surfaces for functions of two/three variables.

   (b) Understand the definition of a neighborhood in the plane; understand and use definition of the limit of a function in two variables; extend the concept of continuity to a function of two/three variables.

   (c) Find and use partial derivatives of two/three or more variables; find higher-order partial derivatives of a function of multiple variables.

   (d) Use the Chain Rules for functions of several variables; find partial derivatives implicitly.

   (e) Find, use, and apply directional derivatives and gradient for a function of two or three variables.

   (f) Determine equations of tangent planes and normal lines to surfaces; find the angle of inclination of a plane in space.

(g) Determine absolute and relative extrema of a function of two variables; use the second partials test to find relative extrema of a function of two variables.

(h) Solve optimization problems on open/closed and bounded domains.

(i) Understand and use the method of Lagrange Multipliers to solve constrained optimization problems.

4. **Multiple Integration**

   (a) Evaluate an iterated integral and use to find the area of a plane region.

   (b) Use a double integral to represent the volume of a solid region and use properties of double integrals; evaluate a double integral as an iterated integral; find the average value of a function over a region.

   (c) Write and evaluate double integrals in polar coordinates.

   (d) Find the mass, center of mass, and moments of inertia of a planar lamina using double integrals.

   (e) Use triple integral to find volume, center of mass and moments of inertia of a solid region.

5. **Vector Fields**

   (a) Understand the concept of a vector field; determine whether a vector field is conservative; find the curl and divergence of a vector field.

   (b) Write and evaluate a line integral, a line integral of a vector field, including in differential form.

   (c) Use the Fundamental Theorem of Line Integrals; understand the concepts of independence of path and conservation of energy.

   (d) Use Green's Theorem to evaluate a line integral.

5 Technical Requirements

5.1 Computer

- A high-speed Internet connection is highly recommended.
- Supported browsers include: *Detailed Supported Browsers and Operating Systems*
- Any computer capable of running a recently updated web browser should be sufficient to access your online course. However, bear in mind that processor speed, amount of RAM and Internet connection speed can greatly affect performance. Be aware, some programs that use mathematics will not work well on mobile devices such as smart phones or tablets.
- Microsoft Office products are available free for all UNM students:
  UNM IT Software Distribution and Downloads page
- Please update your contact information in Loboweb: *MyUNM*. When you log into MyUNM, Enter LoboWeb. Click on the Personal Information link to make sure your contact information is up to date.
- Laptops may be available for checkout for the semester from the *UNM-Valencia Library* . Contact *UNM-Valencia Student Services* for more information.

5.2 Printer/Scanner

You will need access to a printer/scanner in order to print out written assessments such as projects or exams, and scan them in order to submit via UNM Learn. You may download an app such as 'Adobe Scan' on your device in order to scan your work and convert to a PDF for submission.

5.3 Web Conferencing

Web conferencing will be used in this course, particularly during office hours and study sessions. For the online sessions, you will need:

- A USB headset with microphone is recommended. Headsets are widely available at stores that sell electronics, at the UNM Bookstore or online.
- A high-speed internet connection is highly recommended for these sessions. A wireless Internet connection may be used if successfully tested for audio quality prior to web conferencing.
- You should also dress as you would when attending an in-person class, even if you do not turn on your video camera.
- To create a UNM supported Zoom account, visit the *UNM Zoom log in page*.

6 Netiquette

NOTE: For links to online PDF formatted documents, you may need to give permission for the document to open. Look for a pop-up window asking for your permission.

One of the overriding principles in online conversations is to "craft your responses effectively." It is sometimes difficult to remember that there are real people reading posted messages. This is especially true of online communication where others do not have the opportunity to see body language or hear tone of voice; therefore, misunderstandings are more likely.

Please, follow these guidelines in all of your online responses and discussion postings:

- Honor everyone's right to an opinion.
- Respect the right of each person to disagree with others.
- Respond honestly but thoughtfully and respectfully; use language which others will not consider foul or abusive. You may also use emoticons to convey a lighter tone.
- Respect your own privacy and the privacy of others by not revealing information which you deem private and which you feel might embarrass you or others.
- Be prepared to clarify statements which might be misunderstood or misinterpreted by others.

6.1 A Special Note about Anger

- Do not send messages that you have written when you are angry, even anonymous ones. In the online world, angry messages are known as “flamingâ and are considered bad behavior. Venting and flaming are two different things. It is possible to vent without becoming “ugly.â Stick to the facts of what is causing you frustration.
- Do not send messages that are written all in upper case; this is the visual equivalent of SHOUTING. It is considered aggressive and is considered bad behavior. If you ever feel like shouting a message, take a deep breath and wait until you have calmed down before responding. Then, respond in a calm and factual manner.
- For more information on netiquette, please refer to *UNM Netiquette document*.

7 Notes to students about participation in course using UNM Learn:

7.1 Tracking Course Activity

UNM Learn automatically records all studentsâ activities including: your first and last access to the course, the pages you have accessed, the number of discussion messages you have read and sent, web conferencing, discussion text, and posted discussion topics. This data can be accessed by the instructor to evaluate class participation and to identify students having difficulty.

7.2 Submitting Assignments

When you submit an assignment (project/exam) via UNM Learn, please do so by submitting as an attachment in the appropriate dropbox. Do not submit as a link in the comment box. You should be able to view your submission in the submission preview window. You will receive an email receipt of your submission from do-not-reply@learn.unm.edu. Save this email as confirmation of your submission.

8 Coursework and Participation

8.1 Communication with Instructor

I routinely check for student emails, Monday through Friday, at various times throughout the morning, afternoon and evening, as well as occasionally on weekends. Expect a response no later than 24-48 hours. If I haven’t responded within 48 hours, please resend your email, as it may have (accidentally) been overlooked!

8.2 Late or Missing Work

- Homework may be accepted late up to 4 times for the semester, for any reason. Please let me know at least in advance of the due date via UNM email if you have some extenuating circumstance limiting

your ability to submit an assignment. **The quizzes, projects, midterm and final exams must be submitted on time to receive credit**.

- All written work needs to be submitted online. If you have a difficulty using a tool to complete work, use the “Create a Tech Support Ticket" link in the Course Menu immediately and notify your instructor, as well.
- If you are ill and are not able to complete work on time due to a medical/other emergency, please let me know as soon as possible. I will work with you to shift deadlines but be aware that all assignments must be complete by the end of the semester. This may mean that when you are feeling better you will need to spend a lot of extra time to catch up. Also, if you are behind, the posted lectures or class session recordings may not be as helpful to your learning until you are ready to learn that material.

8.3 Expectations for Students

Please note that in order to be successful in this course, and in mathematics courses in general, you will need to spend a fair amount of time each week working on this course.

Here are my recommendations for the amount of time you should be spending in this course *each week*:

- Homework: 8-12 hours/week
- Office Hours: 30 min to 2 hours/week
- General Studying: 2-6 hours/week outside of homework and office hours

A more detailed schedule for assignments, projects, exams and their due dates can be found on Blackboard, and may be subject to change.

9 Required Text and Program

The required text (or eText) for this course is:

- *Calculus, 11th edition*, by Ron Larson and Bruce Edwards.
- **WebAssign** access will be required to complete the homework portion of this course, and a digital copy of the textbook will be included with access.
- You can obtain access to our WebAssign course, as well as your eText via Inclusive Access with RedShelf in Blackboard Learn. Simply go to the ‘Course Materials’ tab in Blackboard and click the ‘RedShelf Course Materials’ link to get started. If you obtained longer-term access in a previous course, and that access hasn’t expired, you will still have access to WebAssign and will not be billed again until the expiration of that access.
- With Inclusive Access to WebAssign, you should not use a credit/debit card/any other purchase methods to purchase access – your Bursar’s account will be billed for this. Please note that Inclusive Access is NOT paid through a course fee. It is billed after the add/drop deadline to your Bursar account on February 4, 2022. If you wish to try to pass the course without this access, you may OPT OUT via the RedShelf Link by the drop date on February 4th. It will not be possible to OPT IN or OPT OUT after this date. Help can be found here: Inclusive Access Help and RedShelf Help.

10 Attendance Policy

Attendance in the course is **required**. If a student misses two or more classes in the first two weeks of the semester, three consecutive class periods without notice, or three or more consecutive quizzes, I reserve the right (but not the obligation) to drop the student from the class. If you stop attending class for any reason, it is your responsibility to make sure you drop the class, or risk getting a failing grade. If you have extenuating circumstances that prevent you from being in class regularly, please contact me so we can discuss this within the first two weeks of the semester.

11 Course Structure

This course will consist of the following graded components:

- Homework (20%)
  - Expect 2 homework assignments per week (most weeks), to be completed via WebAssign. Please note grades in WebAssign do not reflect your overall average in the course, and may not be imported until the end of the semester when all homework assignments are completed. I may drop the lowest 2 assignment grades before importing this average to Blackboard Learn.
- Quizzes (20%)
  - Expect a weekly quiz *most weeks* where your handwritten work will be submitted and graded via BB Learn, beginning with a Review Quiz on Week 1.
- Projects (20%)
  - You will complete 2 projects during this course.
  - Each project will count for 10% of your final grade.
- Midterm Exam (20%)
  - The midterm exam will be given Thursday, March 10, 2022 during class time.
  - You will need to print this exam, complete and submit it to the appropriate dropbox in BB Learn.
- Final Exam (20%)
  - The comprehensive final exam will be held on Thursday, May 12, 2022 from 3-5pm.
  - You will need to print this exam, complete and submit it in the appropriate dropbox in BB Learn.

For written assessment submissions such as quizzes, exams, and projects you should *generally* expect your grades within 1 week. Assignments through WebAssign offer immediate grading upon submission.

12 A Note About Plagiarism/Cheating

Cheating is any behavior that short circuits your learning. This can range from mindlessly mimicking what you see in the readings or examples, to simply copying someone else's solution, to paying someone to complete the assignment or course for you. **The use of any program or app like Chegg, Wolfram Alpha, PhotoMath and others on your computer or phone to copy down solutions for homework, quiz, or exam questions constitutes plagiarism**. ***The penalties for plagiarism may include being given a '0' on the plagiarized assignment/exam, which could result in a significantly lowered/failing grade in the course.*** If you ask for help from someone other than the instructor or a tutor and then just copy down what they tell you, that is also cheating. In all of your assignments you should demonstrate what you understand. If you do not understand, ask for help from your instructor!

13 Grading Policy

Please note: Your average listed in the 'My Grades' section in BB Learn may not include the final homework average until the end of the semester; your homework grade will be computed in WebAssign (dropping the two lowest scores) and weighted into the final average at the end of the course. Grades for all written assignments can be found in the 'My Grades' section in Blackboard Learn throughout the semester.

Final grades will be assigned as shown below:

Cumulative Average	Final Grade
[96.5%, 100%]	A+
[93%, 96.5%)	A
[89.5%, 93%)	A-
[86.5%, 89.5%)	B+
[83%, 86.5%)	B
[79.5%, 83%)	B-
[76.5%, 79.5%)	C+
[69.5%, 76.5%)	C
[66.5%, 69.5%)	D+
[59.5%, 66.5%)	D
[0%, 59.5%)	F

14 Semester Deadlines

Fall 2021: 16-week classes (Full term)

- Tuesday, January 18: First day of class, classes available in Blackboard Learn
- Friday, January 28, by 5:00 pm: Last day to add a class or change credit hours or grade mode in LoboWEB.
- Friday, February 4: Last day to drop without "W" grade and with 100% refund on LoboWeb

- March 13-20: SPRING BREAK
- Friday, April 15: Last day to drop without Deanâs permission on LoboWEB. Will receive a “W" grade and will be responsible for tuition for the course.
- Friday, May 6: Last day to drop with Deanâs permission with form. Will receive a “W" grade and will be responsible for tuition for the course.
- May 9-14: Finals week.

15 UNM Policies

15.1 EQUAL OPPORTUNITY AND NON-DISCRIMINATION:

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees” by the Department of Education (see page 15 of this link). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: *https://policy.unm.edu/university-policies/2000/2740.html*.

15.2 Copyright

All materials in this course fall under copyright laws and should not be downloaded, distributed, or used by students for any purpose outside this course. The *UNM Copyright Guide* has additional helpful information on this topic.

15.3 Accessibility and Accommodations

The American 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 accommodations of their disabilities. If you have a disability requiring accommodation, please contact:

- *UNM-Valencia Student Services* if you are a Valencia campus student. The phone number is 505-925-8560.
- The *UNM Accessibility Resource Center* in 2021 Mesa Vista Hall if you are a main campus student. The phone number is 505-277-3506.

15.4 Academic Integrity

You should be familiar with *UNM's Policy on Academic Dishonesty* and the *Student Code of Conduct* which outline academic misconduct defined as plagiarism, cheating, fabrication, or facilitating any such act.

16 UNM Resources

- *UNM Valencia Campus Tutoring Services*
- *UNM Main Campus CAPS Tutoring Services*
- *UNM-Valencia Library*
- *UNM Libraries*
- *"Life" Resources available to UNM-Valencia Students*
- *Student Health Counseling (SHAC) Online Services*

17 Citizenship And/Or Immigration Status

All students are welcome in this class regardless of citizenship, residency, or immigration status. Your professor will respect your privacy if you choose to disclose your status. As for all students in the class, family emergency-related absences are normally excused with reasonable notice to the professor. UNM as an institution has made a core commitment to the success of all our students, including members of our undocumented community. The Administration's welcome is found on our website: http://undocumented.unm.edu