# Math 1512: DC Calculus 1
## Online Course

Instructor: Andy Taylor

## Contents

# 1 Office and Contact Information:

**Office**: A-123B
**Office Phone**: 505-925-8607
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# 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:

**1:00pm-3:00pm, Monday-Thursday**

However, on certain occasions (such as before exams/project due dates) there may be additional office hours available. Also, if these office hours do not work with your schedule, please let me know and I will be happy to set up an appointment to meet with you Monday thru Friday in the afternoon or evening (as well as on the weekend, if you need to).

***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 1512! Here is the UNM course description:

> Limits. Continuity. Derivative: definition, rules, geometric interpretation and as rate-of-change, applications to graphing, linearization and optimization. Integral: definition, fundamental theorem of calculus, substitution, applications such as areas, volumes, work, averages. (I)
>
> Credit for both this course and MATH 1430 may not be applied toward a degree program.
>
> Meets New Mexico General Education Curriculum Area 2: Mathematics and Statistics.
>
> **Prerequisites/placement**: Prerequisite: (1230 and 1240) or 1250 or ACT Math =>28 or SAT Math Section =>640 or ACCUPLACER Next-Generation Advanced Algebra and Functions =>284.

**Please note: This syllabus is subject to change, if needed.**

# 4 Student Learning Outcomes (SLOs)

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

1. *Limits and Continuity*

   (a) Estimate a limit using a numerical or graphical approach.

   (b) Evaluate a limit using properties of limits, the dividing out technique, the rationalizing technique and the Squeeze Theorem.

   (c) Determine continuity at a point and continuity on an open interval.

   (d) Determine one-sided limits and continuity on a closed interval.

   (e) Use properties of continuity.

   (f) Understand and use the Intermediate Value Theorem.

   (g) Determine infinite limits from the left and right.

   (h) Find and sketch vertical asymptotes of the graph of a function.

2. *Differentiation*

   (a) Find the slope of the tangent line to a curve at a point.

   (b) Use the limit definition to find the derivative of a function.

   (c) Understand the relationship between differentiability and continuity.

   (d) Find the derivative of a function using the Constant Rule, Power Rule, Constant Multiple Rule, Sum and Difference Rules, Product Rule, Quotient Rule, and Chain Rule.

   (e) Use derivatives to find rates of change.

   (f) Find the derivative of a trigonometric function.

   (g) Find a higher-order derivative of a function.

   (h) Distinguish between functions written in implicit form and explicit form.

   (i) Use implicit differentiation to find the derivative of a function.

   (j) Use related rates to solve application problems.

3. *Applications of Differentiation*

   (a) Understand the definition of extrema of a function on an interval.

   (b) Understand the definition of relative extrema on an open interval.

   (c) Find extrema on a closed interval.

   (d) Use Rolle's Theorem and the Mean Value Theorem.

   (e) Determine intervals on which a function is increasing or decreasing.

   (f) Apply the First Derivative Test to find relative extrema of a function.

   (g) Determine intervals of concavity.

   (h) Find any points of inflection of the graph of a function.

   (i) Apply the Second Derivative Test to find relative extrema of a function.

   (j) Determine finite and infinite limits at infinity.

   (k) Determine the horizontal asymptotes, if any, of the graph of a function.

(l) Analyze and sketch the graph of a function.

(m) Solve applied minimum and maximum problems.

(n) Approximate a zero of a function using Newton's Method.

(o) Understand the concept of a tangent line approximation.

(p) Estimate a propagated error using a differential.

4. *Integration*

(a) Use indefinite integral notation for antiderivatives.

(b) Use basic integration rules to find antiderivatives.

(c) Find a particular solution of a differential equation.

(d) Use sigma notation to write and evaluate a sum.

(e) Understand the concept of area, and approximate the area of a plane region.

(f) Find the area of a plane region using limits.

(g) Understand the definition of a Riemann sum.

(h) Evaluate a definite integral using limits and geometric formulas, as well as properties of definite integrals, and the Fundamental Theorem of Calculus.

(i) Use the Mean Value Theorem for Integrals.

(j) Find the average value of a function over a closed interval.

(k) Understand and use the Second Fundamental Theorem of Calculus, as well as the Net Change Theorem.

(l) Use a change of variables, General Power Rule for Integration to find an indefinite integral and evaluate a definite integral.

(m) Evaluate a definite integral involving an even or odd function.

# 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 âcraft your responses effectively.â 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

- Late homework may be accepted for one week after the due date, but please note that it is subject to a penalty of up to 5% per day. Please let me know at least 24 hours in advance via UNM email if you

have some extenuating circumstance limiting your ability to submit an assignment. The midterm and final exams must be submitted on time.

- 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, 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 *minimum* amount of time you should be spending in this course *each week*:

- Homework: 4-6 hours/week

- Office Hours: 30 min to 2 hours/week

- General Studying: 1-3 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

## 10   Attendance Policy

Being a purely online course, attendance is going to be measured by your activity in logging into BB Learn, when appropriate. I would highly recommend you log in at least once per week, and either email me or drop into office hours if there is anything I can help you with! If I notice an extended period of time where you are completely inactive in the course, particularly toward the beginning, you may be at risk of being dropped from our class.

# 11   Course Structure

This course will consist of the following graded components:

- Homework (40%)

    - Expect a homework assignment each week. Your high school instructor will dictate what these consist of and when they are due.

- Projects (30%)

    - You will complete 2 projects during this course.

    - Each project will count for 15% of your final grade.

- Midterm Exam (15%)

    - The midterm exam will be given on the week of March 8th, 2021 to March 12th, 2021 (the week before Spring Break).

    - You will print this exam, complete and submit it to the appropriate dropbox in BB Learn.

- Final Exam (15%)

    - The comprehensive final exam will be available during the week of May 10, 2021 to May 14, 2021 .

    - You will print this exam, complete and submit it in the appropriate dropbox in BB Learn.

For written assessment submissions such as exams, you should typically expect your grades within one week. Assignments through WebAssign should offer immediate grading upon submission.

## 11.1   Ordering of Assignments

I would recommend completing assignments or activities in the following order. Following each lecture:

1. Read through your notes.

2. Complete the given weekly homework.

3. If you need additional assistance, you can use the additional WebAssign learning resources, come talk with me in office hours or seek tutoring through the campus tutoring services mentioned in the 'UNM Resources' section.

## 12  Grading Policy

Your final grades will be calculated as follows. Your current average can be found in the 'My Grades' section in Blackboard.

| 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 |

## 13  Semester Deadlines

Spring 2021: 16-week classes (deadlines will be different for first and second 8-week classes)

- **Tuesday, January 19th**: First day of class, classes available in Blackboard Learn

- **Friday, January 29th, by 5:00 PM**: Last day to add a class or to change credit hours or grade mode in LoboWEB.

- **Friday, February 5th**: Last day to drop without "W" grade and with 100% refund on LoboWEB

- **March 14th through March 21st**: SPRING BREAK

- **Friday, April 16th**: Last day to drop without Dean's permission on LoboWEB. Will receive "W" grade and will be responsible for tuition for the course.

- **Friday, May 7th**: Last day to drop with Dean's permission. Will receive "W" grade and will be responsible for tuition for the course.

- **May 10th- May 15th**: Finals week.

## 14  UNM Policies

### 14.1  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*.

## 14.2  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.

## 14.3  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.

## 14.4  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.

# 15  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*

# 16  General Education Core Curriculum Essential Skills

In addition to the course learning objectives listed above, because this class meets a UNM General Education Core Curriculum requirement, activities in each unit (i.e.: discussions, assignments, and assessments) are developed so that you can demonstrate development of these essential skills:

## 16.1  Critical Thinking

- Problem Setting: Delineate a problem or question to be considered critically.

- Evidence Acquisition: Identify and gather the information/data necessary to coherently address the problem or question.

- Evidence Evaluation: Evaluate the information given by sources for credibility (e.g. bias, reliability, validity) and probably truth.

- Reasoning/Conclusion: Develop conclusions and outcomes that reflect an informed, well-reasoned argument.

## 16.2  Communication

- Genre and Disciplinary Conventions: Use formal and informal rules/registers appropriate for the particular audience, community, purpose, context, and kind of text and/or media at hand; use them to guide formatting, organization, and stylistic choices are present.

- Strategies for Understanding and Evaluating Messages: Apply strategies such as reading/analyzing for main points or themes; recognizing the variety of rhetorical situations and accompanying strategies that may contextualize messages; locating supportive documentation for arguments to understand and evaluate messages in terms of the rhetorical situation.

- Evaluation and Production of Arguments: Recognize and evaluate the authority of sources in their own arguments and those of others; distinguish among supported claims, unsupported claims, facts, inferences, and opinions.

## 16.3  Quantitative Reasoning

- Communication and/or Representation of Quantitative Information: Express quantitative information symbolically, graphically, and in written or oral language

- Analysis of Quantitative Arguments: Interpret, analyze and critique information or a line of reasoning presented by others

- Application of Quantitative Models: Apply appropriate quantitative models to real-world or other contextual problems