

# MATH 1512: Calculus I

#### Instructor

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#### **Class Details**

Tuesday/Thursday Class Time: 1:30-3:20pm Room: VACTC 101 MyMathLab Course ID: *ramirez58136* 

#### **Office Hours**

M/W 11:30-1pm (LRC) T/Th 10-11:30am (LRC) Or by Appointment



"Laboratory Still Life 02" - Don Shank

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### **Course Description**

This course coves Limits. Continuity. Derivative: definition, rules, geometric and rate-of-change interpretations, applications to graphing, linearization and optimization. Integral: definition, fundamental theorem of calculus, substitution, applications to areas, volumes, work, average. Meets New Mexico Lower Division General Education Common Core Curriculum Area II: Mathematics (NMCCN 1614). (4 Credit Hours).



### Prerequisites: ((Math 123 or AC-

CUPLACER College-Level Math = 100-120 or NEXT GEN Advanced A&F = 284-300) and (Math 150 or ACT Math = 28-31 or SAT Math Section = 660-729)) or (Math 153 or ACT Math =>32 or SAT Math Section =>730). Check with your adviser to make sure you meet the requirements.

### **Course Outcomes**

In this course, we will investigate differentiation and integration techniques used to solve applied problems. A complete list of the Student Learning Objectives for this course is given at the end of this syllabus.

## **Course Materials**

### Textbook:

Thomas' Calculus, 14th edition, by Hass, J., Heil, C., & Weir, M., Pearson Publishing.

**Required:** Appropriate MyMathLab (MML) access code (do not purchase a generic code, in this case the code is book specific). You may purchase the 18-week access code for a lower price, but you *cannot* upgrade to the lifetime code once you purchase the restricted one.

**Optional:** You may "upgrade" your access by purchasing a hardcopy of the book directly from Pearson for an additional cost (between \$50 and \$60 before tax). There will be copies of the book on reserve for use in the library (you will not be able to take the book from the library home).

### **Other Requirements:**

• Reliable access to a computer or tablet, and Internet. A computer (laptop or desktop) is recommended. Preferred browsers are Chrome, Firefox, or Safari. Preferred operating systems are Windows or Apple.

### **Other Requirements (continued):**

- Administrative rights to download free software or plug-ins or add-ons on the computer you plan to use for this course. The first time you login to the MyMathLab (MML) homepage run the Installation Wizard to make sure you have all the appropriate software installed. Also, make sure you are allowing popups.
- Pearson account. If you have used any of the Pearson My Lab products before, you can use the same account you created the first time you used it. Otherwise, you can create an account when you register in MyMathLab (MML) for this class. Register by going to <u>mymathlab.com</u>.
- Access to UNM Learn. will use your UNM NetID to log into UNM Learn. You may access it directly via <u>learn.unm.edu</u>
- Standard or Scientific calculator. This cannot be an app on your cell phone.
- Adobe Reader (a free download), preferably version 11.0 or better.

# **Classroom Policies**

Attendance / Participation (100 points) You are expected to be <u>on time</u> to each class and stay the <u>entire</u> class, have the necessary course materials on hand, and participate in the lecture and/or group activities to receive full credit for attendance each day.

**Absences:** If you know ahead of time you will miss a class, send me an email indicating the date of the absence.

Arrange before the next class meeting to get notes from a classmate. The student bears full responsibility for the material and information covered in class.

Each student starts with 100 attendance points. Attendance is taken at the **beginning** of class.



Dodecahedron Loxodrome

### Homework (240 points)

Homework is assigned nearly every week based on the course outline. Weekly assignments in MyMath-Lab must be completed not later than the indicated date in MML. **Each homework assignment is worth 20 points**. The lowest homework grade will be dropped. A 10% penalty may be incurred if your homework is late. You will not be able to go back to improve your grade after the due date.

### Quiz (100 points)

We will have 11 quizzes in class for 10 points each. The lowest grade on a quiz will be dropped. Each quiz will have a few problems from the online homework. The quizzes will resemble the exam and final exam, so you should use them to study.

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# **Classroom Policies**



**Gottfried Wilhelm Leibniz**, (June 21, 1646—November 14, 1716), German philosopher, mathematician, and political adviser, important both as a metaphysician and as a logician and distinguished also for his independent invention of the differential and integral calculus.

### In-Class Group Assignments (60 points)

- During the semester, we will have several inclass assignments. You will work in groups.
- Groups will be between two and three students.
- These assignments will further develop your conceptual understanding of the topics presented in the course.
- You must be present to participate and receive any credit.
- Each in-class assignment is worth 10 points. Each group member receives the same grade.

### Exams (200 points)

There will be two exams during the semester based on the quizzes and homework in the course. Each is worth 100 points. If you are ill or an unexpected event happens, and you cannot make it to the exam, you have one week to make it up.

### Final Exam (300 points)

The final exam will cover all the topics in the course. It will be based on the exams, quizzes, and homework.

**EXPECTATIONS**: Students are expected to conduct themselves in a polite, courteous, professional and collegial manner. **Cell phones must be** <u>set on silent</u> and <u>be out of sight</u> during class. No food or drink is allowed in the computer labs.

**Time for This Course:** Plan to spend a *minimum* of 9 to 12 hours per week for this class. There is no guarantee you will pass if you dedicate this amount of time, you still need to learn the material and use your time wisely, but those who pass generally are the ones who spend the time needed to learn the material.

Student Resources: If you are struggling in this course, do not be afraid to ask for help!

- Ask My Instructor: Please use the Ask My Instructor button in MyMathLab. This button is available in the computational assignments and in the quizzes and sends a message to my email with a link to the question. Do not just send the link, tell me where in the problem you are struggling.
- Office Hours: See my office hours listed at the beginning of this syllabus.
- Form study groups: You may work together with other members of our class.
- Free Tutoring: The Math Center at Valencia campus has free tutoring and open labs. Call 505-925-8907 for more information.
- Student Services: There are various services provided in our Student Services Department. See below about equal access. Also, we have a testing center, advising, and career placement available: <u>Valencia Student Services</u>

# **University Policies**

**Equal Access:** In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as I am not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.

If you need an accommodation based on how course requirement interact with the impact of a disability, you should contact me to arrange an appointment as soon as possible. At the appointment we can discuss the course format and requirements, anticipate the need for adjustments and explore potential accommodations. I rely on the Disability Services Office for assistance in developing strategies and verifying accommodation needs. If you have not previously contacted them I encourage you to do so.



Omar Khayyam 1048-1131 Khayyam was an astronomer, astrologer, physician, philosopher, and mathematician. In 1070, he published *Treatise on Demonstration of Problems of Algebra and Balancing*. In it he showed that a cubic equation can have more than one solution. He also showed how the intersections of conic sections such as parabolas and circles can be utilized to yield geometric solutions of cubic equations.

<www.famousscientists.org/omar-khayyam/>.

If you are a Valencia campus student, contact Equal Access Services at Valencia Campus, Jeanne Lujan at (505)925 -8910 or <u>Valencia Student Services</u>. If you are a main campus student you can receive documentation from the main campus Accessibility Resource Center. I will not guarantee accommodation without the appropriate documentation.

**Collegial Behavior:** Since I assume you are all adults, I will expect respectful adult behavior. Engaging in disruptive or unruly behavior could result in your being asked to leave, at which time you will be counted absent and a referral will be sent to the Associate Dean of Student Services. Continuing to behave in this way could result in your being dropped from the course. Disruptive or unruly behavior includes but is not limited to:

- texting or talking on your cell phone at any time during class,
- continually talking with your neighbor when we are not working on a group activity,
- working on homework from another class,
- reading material or watching media on a mobile device not related to this course or at a time that is inappropriate,
- refusing to participate in the class activities.

#### **Academic Integrity**

Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. Here is the link to the UNM Academic Dishonesty Policy: <u>https://policy.unm.edu/regents-policies/section-4/4-8.html</u>.

#### The policy states:

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails to meet the expected standards.

## University Policies (continued)

Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

### Academic Dishonesty is defined as:

"Academic dishonesty" includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.



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#### **Cavalieri's Principle**

**Bonaventura Cavalieri**, (1598 — 1647) Italian mathematician who made developments in geometry that were precursors to integral calculus. Cavalieri observed that figures (solids) of equal height and in which all corresponding cross sections match in length (area) are of equal area (volume).

**Title IX Statement**: 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 pg. 15 http://www2.ed.gov/about/offices/list/ocr/docs/ qa-201404-title-ix.pdf). 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

# Grading

### **COURSE AVERAGES:**

Attendance/Class Participation	100 points
MyMathLab Online Homework	240 points
Quizzes	100 points
In-Class Group Assignments	60 points
Term Exam (two, 100 points each)	200 points
Cumulative Final Exam	300 points
Total	1000 points

### **GRADING SCALE**:

Letter Grade	Weighted Average
Α	[90, 100]
В	[80, 90) <sup>–</sup>
С	[70, 80]
D	[60, 70]
F	[0, 60)

Week	Dates	Sections / Topics	Assignments	
1	8/20-8/22	Introduction		
	T/Th	Sec. 2.1, 2.2		
2	8/27-8/29	Sec. 2.4, 2.5, 2.6	MML homework 1 due	
	T/Th		Quiz #1	
	8/30 F	Last day to add a course (5pm)		
3	9/3-9/5 T/Th	Labor Day 9/2 (No Class) Sec. 3.1, 3.2	MML homework 2 due Quiz #2	
	9/6 F	Last day to drop a course without a grade (5pm)		
4	9/10-9/12 T/Th	Sec. 3.3, 3.4	MML homework 3 due Quiz #3	
5	9/17-9/19	Review	MML homework 4 due	
	T/Th	Exam #1		
6	9/24-9/26 T/Th	Sec. 3.5, 3.6, 3.7		
7	10/1-10/3	Sec. 3.8, 3.9	MML homework 5 due	
	T/Th		Quiz #4	
8	10/8 T	Sec. 4.1, 4.2	MML homework 6 due Quiz #5	
10/10 - 10/11 Fall Break				
9	10/15-10/17 T/Th	Sec. 4.3, 4.4	MML homework 7 due Quiz #6	
10	10/22-10/24	Sec. 4.5	MML homework 8 due	
	T/Th	Review	Quiz #7	
11	10/29-10/31	Exam #2		
	T/Th	Sec. 4.7		
12	11/5-11/7 T/Th	Sec. 5.1, 5.2, 5.3	MML homework 9 due Quiz #8	
	11/8 F	Last day to drop without Dean's Permission (5pm)		
13	11/12-11/15 T/Th	Sec. 5.4, 5.5	MML homework 10 due Quiz #9	
14	, 11/19-11/21 T/Th	Sec. 5.6, 6.1	MML homework 11 due Ouiz #10	
15	11/26	Sec. 6.3	MML homework 12 due	
	Т		Quiz #11	
11/28 - 11/29 Thanksgiving Break				
16	12/3-12/5	Review	MML homework 13 due	
	T/Th			
	12/6 F	Last day to drop with Dean's permission/change grade mode with form (5pm)		
17	12/9	Final Exam Week		

# **Course Student Learning Outcomes**

Upon successful completion of the course, students will be able to:

- **A.** State, motivate and interpret the definitions of continuity, the derivative, and the definite integral of a function, including an illustrative figure, and apply the definition to test for continuity and differentiability. In all cases, limits are computed using correct and clear notation. Student can interpret the derivative as an instantaneous rate of change, and the definite integral as an averaging process.
- **B.** Use the derivative to graph functions, approximate functions, and solve optimization problems. In all cases, the work, including all necessary algebra, is shown clearly, concisely, in a well-organized fashion. Graphs are neat and well-annotated, clearly indicating limiting behavior. English sentences summarize the main results and appropriate units are used for all dimensional applications.
- **C.** Graph, differentiate, optimize, approximate and integrate functions containing parameters, and functions defined piecewise. Differentiate and approximate functions defined implicitly.
- **D.** Apply tools from pre-calculus and trigonometry correctly in multi-step problems, such as basic geometric formulas, graphs of basic functions, and algebra to solve equations and inequalities.
- **E.** State the main theorems of calculus correctly, including all conditions, and give examples of applications. These include the Intermediate Value Theorem, the Mean Value Theorem, the Extreme Value Theorem, and the Fundamental Theorem of Calculus.
- **F.** Solve simple first and second order differential equations, either initial or boundary value problems, including problems where the derivative is given by a piecewise function, or when the initial value problem is described in words, such as in applications from physics, biology and engineering. Be familiar with the harmonic oscillator and describe period, amplitude, phase-shift of the trigonometric functions that appear.