# **Applied Calculus [CMAT 2103] Syllabus**

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**Course Number and Title:** Applied Calculus [CMAT 2103]
(From the [statewide common course information](https://regents.la.gov/wp-content/uploads/2021/11/CmnCrsCatalog-2021-22-FINAL-APPROVED.pdf).)

**Course Brief Description:** An introduction to differential and integral calculus, with an emphasis on applications, designed primarily for business, economics, and social sciences. Topics include limits, the first and second derivative, the first and second derivative tests for relative extrema; exponential and logarithmic functions; the definite and indefinite integral, and the Fundamental Theorem of Calculus. Calculus will be used to solve real world applications. This course is not equivalent to Calculus I and does not serve as a prerequisite for Calculus II. (From the [statewide common course information](https://regents.la.gov/wp-content/uploads/2021/11/CmnCrsCatalog-2021-22-FINAL-APPROVED.pdf).)

**Credit Hours:** 3

**Prerequisite Knowledge:** To be successful in this course, students should have taken College Algebra [CMAT 1213] as a prerequisite.

**Course Goals:**

At the end of this course, students will be able to:

1. Review exponents, graphs, and functions from Algebra.
2. Apply the concepts of limits and continuity to functions.
3. Interpret the derivative as a slope of the tangent line and an instantaneous rate of change.
4. Find the derivative of functions, including determining the tangent line to the function at a specific given point, and relate to the concept of rate of change.
5. Apply the first and second derivative tests to locate relative extrema.
6. Describe the relation between definite integrals and areas between the graph and the horizontal axis.
7. Use techniques of integration to find particular or general antiderivatives.
8. Apply the Fundamental Theorem of Calculus to evaluate definite integrals.
9. Solve applied problems involving business, economics, and the social sciences.

**Course Materials:**

1. This course uses a free Pressbook resource: Applied Calculus (<https://louis.pressbooks.pub/appliedcalculus/>)
2. This course is taught with MyOpenMath, a free online assessment platform (<https://www.myopenmath.com/>)

**Instructor Contact Information:** [*Kept as a placeholder for future adopters]*

* Name:
* Email:
* Phone:
* Office:
* Office Hours:
* Communication policy:

**Course Schedule:**

| **Week** | **Topics and Concepts** | **Corresponding Course Materials**  |
| --- | --- | --- |
| 1 | Getting started on the course. | Welcome, Learner Support, and Getting Started Modules |
| 2 | Chapter 1: Algebra Review* Section 1.1 Functions
* Section 1.2 Operations on Functions
* Section 1.3 Linear Functions
 | Module 1: Algebra Review* Read Sections 1.1 – 1.3 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 1.1 – 1.3
* Practice problems on Chapter 1 Review Exercises (for Sections 1.1 – 1.3)
 |
| 3 | Chapter 1: Algebra Review* Section 1.4 Exponents
* Section 1.5 Quadratics
* Section 1.6 Polynomials and Rational Functions
 | Module 1: Algebra Review* Read Sections 1.4 – 1.6 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 1.4 – 1.6
* Practice problems on Chapter 1 Review Exercises (for Sections 1.4 – 1.6)
 |
| 4 | Chapter 1: Algebra Review* Section 1.7 Exponential Functions
* Section 1.8: Logarithmic Functions
 | Module 1: Algebra Review* Read Sections 1.7 & 1.8 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 1.7 & 1.8
* Practice problems on Chapter 1 Review Exercises (for Sections 1.7 & 1.8)
 |
| 5 | Chapter 2: Limits and The Derivative* Section 2.1: Limits and Continuity
 | Module 2: Limits* Read Section 2.1 in the Pressbook
* Watch videos
* Complete homework assignments for Section 2.1
* Practice problems on Chapter 2 Review Exercises – Limits (Section 2.1)
 |
| 6 | Chapter 2: Limits and The Derivative* Section 2.2: The Derivatives
* Section 2.3: The Power and Sum Rules for Derivatives
 | Module 3: The Derivative* Read Sections 2.2 & 2.3 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 2.2 & 2.3
* Practice problems on Chapter 2 Review Exercises – The Derivative (for Sections 2.2 & 2.3)
 |
| 7 | Chapter 2: Limits and The Derivative* Section 2.4: Product and Quotient Rules
* Section 2.5: Chain Rule
 | Module 3: The Derivative* Read Sections 2.4 & 2.5 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 2.4 & 2.5
* Practice problems on Chapter 2 Review Exercises – The Derivative (for Sections 2.4 & 2.5)
 |
| 8 | Midterm Exam | Midterm Assessment Module |
| 9 | Chapter 3: Applications of the Derivative* Section 3.1: Second Derivative and Concavity
* Section 3.2: Optimization
 | Module 4: Applications of the Derivative* Read Sections 3.1 & 3.2 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 3.1 & 3.2
* Practice problems on Chapter 3 Review Exercises (for Sections 3.1 & 3.2)
 |
| 10 | Chapter 3: Applications of the Derivative* Section 3.3: Curve Sketching
* Section 3.4: Applied Optimization
 | Module 4: Applications of the Derivative* Read Sections 3.3 & 3.4 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 3.3 & 3.4
* Practice problems on Chapter 3 Review Exercises (for Sections 3.3 & 3.4)
 |
| 11 | Chapter 3: Applications of the Derivative* Section 3.5: Other Applications
* Section 3.6: Implicit Differentiation and Related Rates
 | Module 4: Applications of the Derivative* Read Sections 3.5 & 3.6 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 3.5 & 3.6
* Practice problems on Chapter 3 Review Exercises (for Sections 3.5 & 3.6)
 |
| 12 | Chapter 4: The Integral* Section 4.1: The Definite Integral
* Section 4.2: The Fundamental Theorem and Anti-differentiation
 | Module 5: The Integral* Read Sections 4.1 & 4.2 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 4.1 & 4.2
* Practice problems on Chapter 4 Review Exercises (for Sections 4.1 & 4.2)
 |
| 13 | Chapter 4: The Integral* Section 4.3: Antiderivatives of Formulas
* Section 4.4: Substitution
 | Module 5: The Integral* Read Sections 4.3 & 4.4 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 4.3 & 4.4
* Practice problems on Chapter 4 Review Exercises (for Sections 4.3 & 4.4)
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| 14 | Chapter 4: The Integral* Section 4.5: Average Value and The Net Change Theorem
* Section 4.6: Applications to Business
 | Module 5: The Integral* Read Sections 4.5 & 4.6 in the Pressbook
* Watch videos
* Complete homework assignments for Sections 4.5 & 4.6
* Practice problems on Chapter 4 Review Exercises (for Sections 4.5 & 4.6)
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| 15 | Final Exam | Final Exam Module |

**Course Policies:**

**Technology Requirements**

You will need regular computer access, preferably a home computer with broadband Internet access. You should also have an alternative plan to complete online assignments in the event of computer or internet failure. This course is delivered via Moodle and MyOpenMath (integrated in Moodle).

**Computer Skills**

To be successful in this course, you should be comfortable with the following:

* using computer access with broadband internet
* using email for communication, especially sending an email attachment
* using Moodle
* using a calculator
* using a webcam (making sure it is connected and works properly)

**Evaluation of Learning**

* Assessments: The student will be assessed and graded using all the following assessment tools:

20% Homework

20% Discussion Forums

30% Midterm Exam

30% Final Exam

Homework is designed to give you practice on the learning objectives. Don't wait until last minute to start these! They will be given for each topic/section covered and students should work on them to reinforce the material in the course. No homework assignments will be accepted after the last day of the semester and after the Final Exam. No low or missing homework assignment grades will be dropped at the end of the semester.

Discussion Forums are designed for you to illustrate your knowledge of concepts covered, help your classmates learn something they struggle with in the course, and keep active participation between the course, your classmates, and the instructor. Specific directions for what to post in each forum are provided in the actual discussion. No graded discussion forum will be dropped at the end of the semester.

Exams are designed to demonstrate that you learned the material in the course and can apply it. These are the ultimate guide and indication of concepts learned in the course. The Midterm Exam and Final Exam will be given at the midway point and end of the semester, respectively. No low Exams scores will be dropped at the end of the semester. Exams will only be extended or made-up dependent on the student’s reason for missing or needing an extension.

* Activities:
	1. In the Moodle course there are links to the sections of the textbook and videos provided from YouTube. These should be used for learning the material in the course.
	2. In the Pressbook you will find H5P content (interactive activities with feedback). These should be used for self-practice – they are not part of the grade in the course.

**Grading Policy**

* Grading Scale:

|  |  |
| --- | --- |
| 90 – 100 | A |
| 80 – 89 | B |
| 70 – 79 | C |
| 60 – 69 | D |
| 0 – 59 | F |

* Late Policy for Homework: Homework assignments can be completed late with a penalty, using the MyOpenMath LatePass. The following is the LatePass policy for the course:
1. Any homework assignments completed during the LatePass period will have a X%-point deduction. This is better than a zero though!
2. You can use a LatePass on each individual Section Assignment and you can only ask for a LatePass once per assignment.
3. Using a LatePass will extend the due date of the homework assignment until the end of the semester. No homework assignments will be accepted after the last day of the semester and after the Final Exam.
* Late Policy for Other Assessments: No other assessments will be accepted submitted late.

**University Policies and Support:** [*Kept as a placeholder for future adopters]*

* **Code of Conduct**
* **Online Etiquette**
* **Academic Integrity**
* **Diversity Statement**
* **Accessibility and Disability Services**
* **Technology Support**
* **Academic Support Services**