

CM-101 (Calculus I)

(Core – Skill and Knowledge)

COURSE DESCRIPTION

Course code number	CM-101	Course Title	Calculus I
Semester hours	3 hours	No. of Credit Units	3
Prerequisite	None	Course Coordinator	

Course Description

Calculus is a foundational course. This introductory calculus course covers differentiation and integration of functions of one variable, with applications. Topics include: the concept of functions, limits and continuity of functions, the derivative, differentiation rules, applications of differentiation, integration and applications of integration.

Textbook

Thomas' Calculus in SI Units, 14/E, 14th Edition, Joel R. Hass, Christopher E. Heil and Maurice D. Weir.

Course Outcomes

Students who complete the course will be able to

1. Compute limits of algebraic and transcendental functions.
2. State, use, and interpret the definitions of continuity and the derivative in terms of limits.
3. Formulate derivatives of algebraic and transcendental functions using the power, product, quotient, and chain rules.
4. Apply the derivative to calculate rates of change and solve applied optimization problems.
5. Understand the concept of indefinite integral as anti-derivative and know standard indefinite integrals and basic rules of indefinite integration.
6. Apply integration to compute arc lengths, volumes of revolution and surface areas of revolution.

Major Topics Covered in the Course

1. Functions
2. Limits and Continuity
3. Differentiation
4. Applications of Derivatives
5. Integrals
6. Applications of Integration

Assessment Plan for the Course

Class Attendance participation	-	10%
Quizzes	-	10%
Assignment	-	20 %
Test	-	10%
Final Exam	-	50%

Grading System

UCSY follows a letter grade system comprising of grades A, A-, B+, B, B-, C+, C, C-, D and F. All marks obtained by students during the semester will be used in the grading process. A grade of "D" is considered a passing grade for undergraduate courses. For undergraduate students, a grade of "C" or better is required in this course because it is a prerequisite for other courses in the program. **The student who gets the grade point less than 2 must do Re-Exam.**

The grading scale for this course is:

Marks obtained	Letter Grade	Grade Point
≥ 90	A	4
85 – 89	A-	3.75
80 – 84	B+	3.25
75 – 79	B	3
70 – 74	B-	2.75
65 – 69	C+	2.25
60 – 64	C	2
55 – 59	C-	1.75
50 – 54	D	1
0 – 49	F	0

Fail Grade and Re-Exam: C-,D,F (Grade point <2)

Class Attendance and Participation Policy:

- **Attendance**

Class attendance is **mandatory**. Most of the material you will learn will be covered in the lectures, so it is important that you not miss any of them. You are expected to show up **on time** for class, and **stay for the whole lecture**. Students are expected to attend each class, to complete any required preparatory work (including assigned reading) and to participate actively in lectures, discussions and exercises.

- Mobile phones **must** be silenced and put away for the entire lecture unless use is specified by the instructor. You may not make or receive calls on your cell phone, or send or receive text messages during lectures.
- You are responsible for all material sent as email. Ignorance of such material is no excuse. You are responsible for all materials presented in the lectures.
- Your conduct in class should be conducive towards a positive learning environment for your class mates as well as yourself.

- **Quizzes, assignments, tests and Exam**

Your performance in this class will be evaluated using your scores for attendance, quizzes, homework assignments, two tests and one final examination. There are no planned extra credit projects or assignments to improve your grade.

We will take a short quiz for every lecture.

There will be 14 homework assignments, roughly one per week. Please show all your work and write or type your assignments neatly. Credit cannot be given for answers without work (except on true-false, always-sometimes-never, or other multiple choice questions).

Test will start after two or three chapters finished and the coordinator will announce the date for the test.

Any assignment or quiz or test is simply missed, regardless of the reason why (e.g. illness, work, traffic, car trouble, computer problems, death, etc.), and **earns a grade of zero**. You are strongly encouraged to complete all assignments and attend all quizzes so that you can check that you understand the material and can throw out bad grades, or grades for which you had to miss an assignment or quiz for a valid reason.

Late submissions will not be accepted for any graded activity for any reason.

- **There are no extra credit opportunities.**

Students may not do additional work nor resubmit any graded activity to raise a final grade.

- **Exam**

The exam will be conducted on-campus, in a classroom. The dates/times/locations will be posted on Board as soon as possible.

For this course, the following additional requirements are specified:

All work submitted for a grade must have been prepared by the individual student. Students are expressly prohibited from sharing any work that has been or will be submitted for a grade, in progress or completed, for this course in any manner with a person other than the instructor and teaching assistant(s) assigned to this course). Specifically, students may not do the following, including but not limited to:

- Discuss questions, example problems, or example work with another person that leads to a similar solution to work submitted for a grade.
- Give to, show, or receive from another person (intentionally, or accidentally because the work was not protected) a partial, completed, or graded solution.
- Ask another person about the completion or correctness of an assignment.
- Post questions or a partial, completed, or graded solution electronically (e.g. a Web site).
- All work must be newly created by the individual student for this course. Any usage of work developed for another course, or for this course in a prior semester, is strictly prohibited without prior approval from the instructor.
- Posting or sharing course content (e.g. instructor provided lecture notes, assignment directions, assignment questions, or anything not created solely by the student), using any non-electronic or electronic medium (e.g. web site, FTP site, any location where it is accessible to someone other than the individual student, instructor and/or teaching assistant(s)) constitutes copyright infringement and is strictly prohibited without prior approval from the instructor.

Tentative Lesson

No	Topics	Week	Remark
I	Functions		
1	1.1 Functions and Their Graphs	Week 1	
2	1.2 Combining Functions; Shifting and Scaling Graphs		
3	1.3 Trigonometric Functions		
4	1.4 Exponential Functions		Assignment 1
II	Chapter 2 Limits and Continuity	Week 2	
5	2.1 Rates of Change and Tangents to Curves		
6	2.2 Limit of a Function and Limit Laws		
7	2.3 The Precise Definitions of a Limit		Assignment 2
8	2.4 One-Sided Limits	Week 3	
9	2.5 Limits Involving Infinity; Asymptotes of Graphs		
10	2.6 Continuity		Assignment 3
III	Chapter 3 Differentiation	Week 4	
11	3.1 Tangents and the Derivative at a Point		
12	3.2 The Derivative as a Function		Assignment 4
13	3.3 Differentiation Rules	Week 5	
14	3.4 The Derivative as a Rate of Change		Assignment 5
15	3.5 Derivatives of Trigonometric Functions	Week 6	
16	3.6 The Chain Rule		
17	3.7 Implicit Differentiation		Assignment 6
18	3.8 Related Rates	Week 7	
19	3.9 Linearization and Differentials		
20	Test I		Assignment 7
IV	Chapter 4 Applications of Derivatives	Week 8	
21	4.1 Extreme Values of Functions on Closed Intervals		
22	4.2 The Mean Value Theorem		Assignment 8
23	4.3 Monotonic Functions and the First Derivative Test	Week 9	
24	4.4 Concavity and Curve Sketching		Assignment 9
25	4.5 Applied Optimization	Week 10	
26	4.6 Newton's Method		
27	4.7 Antiderivatives		Assignment 10

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No	Topics	Week	Remark
V	Chapter 5 Integrals	Week 11	
28	5.1 Area and Estimating with Finite Sums		
29	5.2 Sigma Notation and Limits of Finite Sums		Assignment 11
30	5.3 The Definite Integral	Week 12	
31	5.4 The Fundamental Theorem of Calculus		Assignment 12
32	5.5 Indefinite Integrals and the Substitution Method	Week 13	
33	5.6 Definite Integral Substitutions and the Area Between Curves		
34	Test II		
VI	Chapter 6 Applications of Definite Integrals	Week 14	
35	6.1 Volumes Using Cross-Sections		
36	6.2 Volumes Using Cylindrical Shells		Assignment 13
37	6.3 Arc Length	Week 15	
38	6.4 Areas of Surfaces of Revolution		
39	6.5 Work and Fluid Forces		
40	6.6 Moments and Centers of Mass		Assignment 14
	Final Exam		