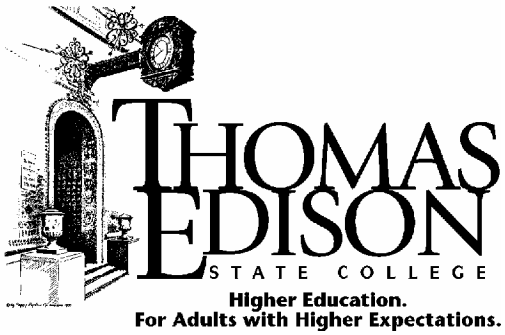
Directed **I**ndependent **A**dult **L**earning

COURSE SYLLABUS
AND
STUDY GUIDE

CALCULUS I

MAT-231-GS



Course Syllabus and Study Guide by
Marvin Barsky, Ph.D.

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COURSE ESSENTIALS

Course Description

Calculus I is an intensive, higher-level course in mathematics that builds on courses like **Precalculus for Technology.** The course aims at serving the needs of a wide student audience, including students in engineering, mathematics, the physical and life sciences, and economics. It is constructed around multiple focal points with the intention of helping students become creative and efficient problem solvers, using technology as a means of discovery of numerical, graphical, and analytical solutions to problems.

The course also emphasizes communication skills and requires students to interpret, describe, discuss, justify, and conjecture as they search for solutions to problems. Real-life applications provide links with students' life worlds.

Topics covered include the Cartesian plane, limits and continuity, problems of tangents, velocity and instantaneous rates of change, rules for differentiation, implicit differentiation, maxima and minima theory, antiderivatives and the indefinite integral, exponential and logarithmic functions, and the area between curves.

Course Objectives

Calculus I has as its overall objective to assist you in acquiring high-level skills in problem solving, the use of technology, communicating mathematics, and real-life applications.

- **Problem Solving** We encourage and assist you in becoming creative and efficient problem solvers by requiring you to consider numerical, graphical, and analytical solutions to problems.
- **Use of Technology** The course integrates the use of graphing utilities and symbolic algebra systems into its presentation as a means of discovery, to reinforce concepts, and as an efficient problem-solving tool. While noting the benefits of technology, the course also addresses its misuses.
- **Communicating Mathematics** Communication skills receive special emphasis. You work on exercises calling for interpretations, descriptions, discussions, justifications, and conjectures.
- **Real-life Applications** Varied and real-life applications serve to emphasize the applied content of the subject and to contextualize the content by providing links with your life world.

Course Materials

In addition to the combined Course Syllabus and Study Guide, which consists of "Course Essentials" and "Course Calendar" and contains the course modules, study units, and module-ending written assignments, you will need the following materials to do the work of the course.

Textbook

Calculus: Early Transcendental Functions, 4th ed., by Ron Larson, Robert Hostetler, and Bruce H. Edwards (Boston: Houghton Mifflin, 2007)

Solutions Manual

Study and Solutions Guide for "Calculus: Early Transcendental Functions, Fourth Edition," vol. 1, *Chapters 1–10,* by Bruce H. Edwards (Boston: Houghton Mifflin, 2007)

Course Structure

Calculus I consists of sixteen study units grouped into nine modules (see Course Modules and Study Units after the "Course Calendar").

Module	***Module Title***	***Unit(s)***
1	The Cartesian Plane and Functions	1
2	Limits and Continuity	2 and 3
3	Problems of Tangents, Velocity, Instantaneous Rates of Change	4
4	Rules for Differentiation: Product, Quotient, Chain, General Power	5 and 6
5	Implicit Differentiation and Related Rates	7 and 8
6	Maxima and Minima Theory	9, 10, and 11
7	Antiderivatives and the Indefinite and Definite Integral	12 and 13
8	Integration Techniques and Logarithmic and Exponential Functions	14 and 15
9	Area between Curves	16

Each study unit in the study guide portion of the manual includes a list of learning objectives, a list of (or reference to) real-life applications, a textbook assignment, a technical commentary (lecture notes that provide helpful hints and steer you away from potential pitfalls), and practice exercises that you can work through on your own with the help of the solutions manual.

At the end of each module is a written assignment that you are to complete and send to your mentor for correction and grading. In addition, the course requires you to take *two* (2) examinations, a midterm during Week 8 and a final during Week 16 of the semester.

Study Tips

To stay on track throughout the course, begin each week by consulting the "Course Calendar" in the syllabus. The calendar indicates which unit(s) to study each week and which textbook sections to read. It also tells you which written assignments to prepare, when they are due to be sent to your mentor, and when to schedule your examinations.

Before you begin working on your assignments, take the time now to fill in the dates for the current semester in the second column of the "Course Calendar." The week-by-week dates you need to plan your semester's work are located in the General Course Instructions section of the course manual. In the last column of the calendar, fill in the exact dates when you are to send assignments to your mentor and the dates that you have scheduled for the exams.

Begin each study unit in the study guide by reading the learning objectives and real-life applications. These provide an overview of the skills you need to acquire and a firm basis for your work. Then proceed to the sections assigned in the textbook. After studying (not merely reading) the textbook, consult the unit's technical commentary for further discussion, clarification, and helpful hints. Finally, work through the practice exercises to solidify what you have learned and prepare for the written assignment.

Written Assignments

At the end of each module in the study guide is a written assignment consisting of exercise sets from the textbook. Prepare your solutions to these exercises neatly and completely, and send them to the mentor for correction and grading following the instructions given in the Student Handbook section of the course manual. Show all calculations.

Examinations

Calculus I requires you to take two proctored examinations, a midterm during Week 8 and a final during Week 16 of the semester. The exams are open textbook but **not** open notes. You are permitted to bring a scientific calculator and the prescribed textbook without loose inserts. But you are **not** allowed to bring your solutions guide, notes of any kind (including graded or ungraded assignments), or any other reference sources or sources of information.

Both exams consist of problem sets. The midterm examination covers the material from modules 1–5 (study units 1–8; textbook chapters 1–3). The final examination covers the material from modules 6–9 (study units 9–16; textbook chapters 4–5 and 7). Both exams are three hours long.

It is your responsibility to make arrangements to take the examinations. In this regard, be sure to submit the "Proctor Request Form" to the Office of Test Administration **during the first week of the semester.**

Grading

Your grade in the course depends on how well you do on the nine written assignments (30 percent), on the midterm examination (35 percent), and on the final examination (35 percent).

To receive credit for the course, you must earn a letter grade of D or higher on the weighted average of all assigned course work (e.g., exams, assignments, projects, papers, etc.). You will receive a score of 0 for any work not submitted.

Letter grades for assignments and exams are based on the following numerical grades.

93–100	=	A
90–92	=	A–
88–89	=	B+
83–87	=	B
80–82	=	B–
78–79	=	C+
73–77	=	C
70–72	=	C–
60–69	=	D
Under 60	=	F (no credit)

COURSE CALENDAR

Using the table of week-by-week dates in the General Course Instructions section of the course manual, write the dates for the current semester in the second column. In the last column, fill in the actual date for sending each assignment and taking examinations.

Week	Dates	Study Unit(s)	Textbook Section(s)	Written Assignment	Due Date/ Exam Date
Module 1: The Cartesian Plane and Functions					
1		1	1.2, 1.3, and 1.5	1 Due (send by) Monday of Week 2	
Module 2: Limits and Continuity					
2		2	2.2 and 2.3		
3		3	2.4 and 2.5	2 Due (send by) Monday of Week 4	
Module 3: Problems of Tangents, Velocity, Instantaneous Rates of Change					
4		4	3.1 and 3.2	3 Due (send by) Monday of Week 5	
Module 4: Rules for Differentiation—Product, Quotient, Chain, General Power					
5		5 and 6	3.3 and 3.4	4 Due (send by) Monday of Week 6	
Module 5: Implicit Differentiation and Related Rates					
6		7	3.5		
7		8	3.7	5 Due (send by) Monday of Week 8	
8		**MIDTERM EXAMINATION** (Units 1–8; chapters 1–3)			

Week	Dates	Study Unit(s)	Textbook Section(s)	Written Assignment	Due Date/ Exam Date
Module 6: Maxima and Minima Theory					
9		9 and 10	4.1–4.4, 4.5, and 4.6		
10		11	4.7	6 Due (send by) Monday of Week 11	
Module 7: Antiderivatives and the Indefinite and Definite Integral					
11		12	5.1		
12		13	5.2 and 5.3	7 Due (send by) Monday of Week 13	
Module 8: Integration Techniques and Logarithmic and Exponential Functions					
13		14	5.4 and 5.5		
14		15	5.7	8 Due (send by) Monday of Week 15	
Module 9: Area between Curves					
15		16	7.1	9 Due (send by) Monday of Week 16	
16		**FINAL EXAMINATION** (Units 9–16; chapters 4, 5, and 7)			
Please remember to submit your DIAL Course Evaluation.					