

# Calculus I Syllabus

**MAT175 Calculus I:** 4 hours, 4 credits. Differentiation of functions of one variable; applications to motion problems, maximum-minimum problems, curve sketching, and mean-value theorems, Riemann Sums and Fundamental Theorem of Calculus

**Prerequisite:** A grade of C (or better) in MAT 172 or placement by the department.

**Corequisite:** MAT 155 Calculus I Computer Laboratory

**Instructor:** *Your instructor will provide contact info, office hours and meeting times for your section.*

## Grading Policy

**Expectations:** Students are expected to learn both the mathematics covered in class and the mathematics in the textbook and other assigned reading. Completing homework is part of the learning experience. Students should review topics from prior courses as needed using old notes and books.

**Homework:** Approximately four hours of homework will be assigned in each lesson as well as additional review assignments over weekends.

**Exams:** There will be regular quizzes, two midterms and a final exam during finals week. Students who do not pass the departmental final exam will not pass the course.

**Grades:** *The precise grading policy for your section will be distributed by your instructor.*

## Materials, Resources and Accommodating Disabilities

**Textbook:** Larson, Hostetler and Edwards, *Calculus (Early Transcendentals)*, Houghton Mifflin, You may purchase Ed 4 or Ed 5. ISBN:0538735503 or 9780538735506

**Tutoring:** Departmental tutoring is available in Gillet Hall 222.

**Reliable Web Resources:** See <http://comet.lehman.cuny.edu/calculus>

**Reserve:** Selected books have been placed on reserve in the library.

**Accommodating Disabilities:** Lehman College is committed to providing access to all programs and curricula to all students. Students with disabilities who may need classroom accommodations are encouraged to register with the Office of Student Disability Services. For more info, please contact the Office of Student Disability Services, Shuster Hall, Room 238, phone number, 718-960-8441.

## Course Objectives

At the end of the course students should be able to:

1. Evaluate limits (as part of Departmental Objectives in Mathematics a,b and e)
2. Prove basic theorems using limits of the difference equation (as part of a,b and f)
3. Differentiate algebraic and trigonometric functions using key theorems (a,b and e)
4. Find the tangent line to a given graph at a given point (as part of a,b and e)
5. Solve maximum and minimum problems using differentiation (as part of a,b,c and e)
6. Solve related rates problems (as part of a,b and c)
7. Apply methods of calculus to curve sketching (as part of a,b)
8. Antidifferentiation, Riemann Sums and Fundamental Theorem of Calculus (a,b, and e)

*These objectives will be assessed on the final exam along with other important techniques.*

## Course Calendar

*This course and its corequisite are carefully timed to match topics, so stay on schedule. The homework listed below is different in the different editions of the textbook but cover the same types of problems. Check your answers in the back of your textbook.*

### **Lesson 1:** Review Precalculus (Sections 1.1-1.3, 1.6 and D3)

1.1/ 1-14, 19, 21, 53, 55, 63; 1.2/ 19, 23-32, 35, 43, 49-55 odd, 77.

1.3/ 5-9 odd, 13, 17-21 odd, 57-63 odd; 1.6/ 7-15 odd, 19, 25, 27, 49, 59, 91, 93

Trigonometry Appendix Edition 5: C3/11, 13, 15, 19, 31, 37, 51

Edition 4 has an online trigonometry appendix D3 at:

[http://college.cengage.com/mathematics/larson/calculus\\_early/4e/assets/app/appendixd3.pdf](http://college.cengage.com/mathematics/larson/calculus_early/4e/assets/app/appendixd3.pdf)

Please seek help in MAT 155 and in the Math Lab for this precalculus homework.

### **Lesson 2:** Limits (2.2)

2.2/ 1, 3, 5, 11, 13, 15, 17, 19, 21, 23

Review 1.5/ 1, 5, 53, 57, (ed 4: 89, 91, 93) (ed 5: 95, 97, 99)

(math majors should also read Appendix A Thm 2.2-2.5 and do 2.1/31,33)

### **Lessons 3-4:** Evaluating Limits and the Squeeze Theorem (2.3) *including Three Special Limits*

2.3/ 9-21 odd, 37, 43, 45, 53, 57, 69, 79,

(math majors should also read Appendix A Thm 2.8 and do 2.2/ 39, 2.3/ 118, 125)

### **Lesson 5:** Continuity (2.4)

2.4/ 1, 3, 5, 11, 31, 37, 39, 41, 43, 47

### **Lesson 6:** Infinite Limits and Asymptotes (2.5)

2.4/ 49, 51, 55, 57, 59; 2.5/ 1, 3, 7, 9-15 odd, 31, 33, 39, 45, 47,

### **Lesson 7:** Tangent Lines and Derivatives (3.1)

3.1/ 1, 5, 7, 11, 13, 21, 37, 39, 41, 61

Review 1.3/ Example 4, 59, 61, 63

### **Lesson 8:** Basic Derivative Laws (3.2)

3.2/ 3-23 odd

### **Lesson 9:** Velocity and Laws of Differentiation (3.2)

3.2/ 43-61 odd; (Ed 5 3.2/101, 103) or (Ed 4. 3.2/93, 95)

Review 1.5/ 1, 5, 7, 9, 11, 13

### **Lesson 10:** Product and Quotient Rules (3.3)

3.3/ 1-7 odd, 17, 19, 25, 31, 41, 43, 45, 69; (Ed 5 3.2/ 105, 107, 111) or (Ed. 4 3.2/ 93, 99, 103)

### **Lesson 11:** Chain Rule (3.4)

3.4/ 9-15 odd, 23, 25, 29, 49, 51, 55, 59, 63, 67, 79-83 odd, 115, 117

(math majors read Appendix A Thm 3.11)

### **Lesson 12: Review for Exam I on 2.1-3.3:**

Review all prior homework problems and practice doing them quickly

### **Lesson 13: Exam I**

*Students who do poorly on this exam should consider dropping this course and attending a class on precalculus before taking calculus. Please consult with your professor or math advisor for more personalized advice. Bring your exam and homework with you when seeking advice.*

### **Lesson 14:** Implicit Differentiation (3.5-3.6)

3.5/ 1, 7, 29, 33, 35, 47; 3.6/ 7, 15, 25, 45

**Lessons 15-16:** Related Rates (3.7) 3.7/ 1, 5, 13, 15, 27, 39, 41,  
3.8 on Newton's Method will be done in MAT155

**Lessons 17-18:** Extrema, Mean Value Theorem, Increasing/Decreasing (4.1-4.3)  
4.1/ 1, 7, 11-15 odd, 21-35 odd; 4.3/ 3, 5, 9-13 odd, 17, 29-35 odd, 43  
*Review Old Homework on Limits (2.5).*

**Lesson 19:** Concavity (4.4)  
4.4/ 1, 3, 5, 7, 11, 13, 15, 19, 21, 23, 27, 29, 39, 43, 47

**Lesson 20:** Limits at infinity (4.5)  
4.5/ 1, 3, 5, 17-25 odd, 35  
*Curve sketching (4.6) will be covered in MAT155*

**Lesson 21:** Optimization (4.7)  
4.7/ 3-9 odd, 17, 25, 27, 29, 33;

**Lesson 22: Review for Exam II on Chapters 3-4:**  
Review all Chapter 4 homework problems and practice doing them quickly.  
*4.2 and 4.8 are not covered on this exam or the final.*

**Lesson 23: Exam II on Chapters 3-4**

**Lesson 24:** Antiderivatives, Distance, Displacement, Average Velocity  
HW 5.1/ 1,3,17,19,21,25,27,35,81, 87,89,91,

**Lesson 25:** Area, Riemann sums, definite integrals  
HW 5.2/ 7, (ed4 23,25,27,29,35) or (ed5 33,35,41,43,45)  
HW 5.3/ 1,3,5,7,11,15, 17, 19, 25,27,35,41,

**Lesson 26:** Fundamental Theorem of Calculus  
HW 5.4/ 27, 31, 39, 45,47,51,59, 61, 81,83,87,89,91,95,97, 101, (ed 4 109) or (ed 5 113)

**Lesson 27:** Substitutions  
HW 5.5/1,3,5, 11-29 odd, 49-65 odd, (ed4 87, 117, 119, 147, 149) or (ed5 91, 121, 123, 151, 153)

**Lesson 28:** Review for the final exam

**Final Exam:** The Final Exam will be given during Finals Week covering the entire course especially topics needed in future courses.

This syllabus and others are available at: <http://comet.lehman.cuny.edu/calculus/>.

Department of Mathematics and Computer Science, Lehman College, City University of New York