

ESSEX COUNTY COLLEGE – MATHEMATICS DEPARTMENT

MTH 127 Section 001 – Basic Calculus

Fall 2010 Class Syllabus



Instructor: Dr. Susan Gaulden
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Office Hours: Regular – Tuesdays & Thursdays from 6:30 AM to 6:55 AM,
Tuesdays, Thursdays & Fridays from 10:05 AM to 11:15 AM
& Fridays from 2:30 PM to 2:55 PM
By Appointment – Tuesdays & Thursdays from 4:00 PM to 4:50 PM
& Fridays from 2:55 PM to 4:05 PM

Classroom: Room 2102
Class Meeting Times: Tuesdays, Thursdays & Fridays from 11:30 AM to 12:50 PM, from
September 7 to December 17, 2010

Required Textbook: Calculus & Its Applications, by Goldstein, Lay, Schneider & Asmar, 12th edition; published by Pearson Education, Inc., Upper Saddle River, NJ, 2010

PLEASE NOTE: This textbook is sold in the ECC bookstore. See me if you are unable to purchase the book during the first week of classes. Copies of the textbook are available on reserve in the Library and for use in the Learning Center.

Other Suggested Supplies: Students are expected and encouraged to use a graphing and/or scientific calculator to enhance understanding during class or while doing homework. Calculators are also permitted to be used but *not shared* on tests and exams.

Course Prerequisite: Grade of “C” or better in MTH 100 or placement

Course Co-requisite: None

Course Description: This course is an intuitive approach to differential and integral calculus of a single variable, with an introduction to multivariable differential calculus, emphasizing applications in business, economics, and the social sciences.

General Education Goals: MTH 127 is affirmed in the following General Education Foundation Category: **Quantitative Knowledge and Skills**. The corresponding General Education Goal is as follows: Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Course Goals: Upon successful completion of this course, students should be able to do the following:

1. demonstrate knowledge of the fundamental concepts and theories from pre-calculus, calculus, and introductory ordinary-differential equations;
2. utilize various pre-calculus, calculus, and introductory differential equation problem-solving and critical-thinking techniques to set up and solve applied problems in finance, economics, geometry, sciences, and other fields;
3. communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions; and
4. use graphing calculators effectively as a tool to solve such problems as those described above.

Measurable Course Performance Objectives: Upon successful completion of this course, students should specifically be able to do the following:

1. Demonstrate knowledge of the fundamental concepts and theories from pre-calculus, calculus, and introductory ordinary-differential equations:
 - 1.1 *evaluate and graph (using the first-derivative and second-derivative tests as appropriate) polynomial, piecewise, composite, exponential, logarithmic, and multi-variable functions;*
 - 1.2 *solve linear, quadratic, exponential, and logarithmic equations;*
 - 1.3 *determine limits, continuity, and differentiability of given functions at specified values;*
 - 1.4 *determine a derivative of a function by using limits and difference quotients;*
 - 1.5 *calculate first, second, or partial derivatives of polynomial, rational, exponential, and logarithmic functions by using rules of differentiation including the product, quotient, and chain rules and techniques of integration including implicit and logarithmic differentiation;*
 - 1.6 *calculate Riemann sums to estimate definite integrals;*

**Measurable Course
Performance Objectives**
(continued)

- 1.7 *apply the Fundamental Theorem of Calculus to calculate integrals of single variable functions and determine the areas between given curves; and*
- 1.8 *determine a specified volume of revolution*
2. Utilize various pre-calculus, calculus, and introductory differential equation problem-solving and critical-thinking techniques to set up and solve applied problems in finance, economics, geometry, sciences, and other fields:
 - 2.1 *solve compound interest, present value, and future value problems;*
 - 2.2 *solve marginal cost, marginal profit, and marginal revenue problems by using differentiation and integration as necessary;*
 - 2.3 *solve rate-of-change and related rates problems;*
 - 2.4 *solve optimization problems (in geometry, finance, inventory control, etc.) including those involving functions of several variables;*
 - 2.5 *solve growth and decay problems (in finance, biology, chemistry, physics, etc.); and*
 - 2.6 *solve elasticity of demand problems*
3. Communicate accurate mathematical terminology and notation in written and/or oral form in order to explain strategies to solve problems as well as to interpret found solutions:
 - 3.1 *write and explain solutions to application problems including related rates, optimization, inventory control, growth and decay, and elasticity of demand problems*
4. Use graphing calculators effectively as a tool to solve such problems as those described above:
 - 4.1 *use the GRAPH feature to display polynomial, piecewise, composite, exponential, logarithmic, and multi-variable functions; and*
 - 4.2 *use the TABLE feature to determine account balances for given compound interest problems*

Methods of Instruction:

Instruction will consist of a combination of lectures, presentation of sample problems, clarification of homework exercises and textbook material, general class discussion, and individual study.

Class Requirements:

All students are required to:

1. Read the textbook and do the suggested homework problems in a timely manner.
2. Be an active participant in all classes.
3. Take tests/exams in class and adhere to the test/exam schedule.

Grading:

6 Class Tests (12 % each)	= 72 %
1 Final Exam	= 28 %
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	Total = 100 %

Please note the following items that pertain to grading in this course:

- Completing assigned reading and homework in a timely manner and contributing to class discussions will greatly enhance your chance of success in this course. Mathematics cannot be understood without doing a significant amount of outside study.
- There are NO MAKE-UP TESTS or EXAMS. You will be excused from a missed test or exam only if you contact me immediately to explain reasonable circumstances. If you are not excused, then you will receive a grade of ZERO for all missed tests or exams.
- In determining final course grades, consideration will be given to class attendance, punctuality, assignment completion and participation. Excessive absences or lateness usually negatively affects student understanding of the material and, therefore, performance in this course.
- Incomplete grades will only be given to students with a 'C' average or better who are unable to take the final exam. You must contact me immediately if you miss the exam and give a valid explanation of why you were unable to take the final.

Academic Integrity:

Dishonesty disrupts the search for truth that is inherent in the learning process and so devalues the purpose and the mission of the College. Academic dishonesty includes, but is not limited to, the following:

- plagiarism – the failure to acknowledge another writer’s words or ideas or to give proper credit to sources of information;
- cheating – knowingly obtaining or giving unauthorized information on any test/exam or any other academic assignment;
- interference – any interruption of the academic process that prevents others from the proper engagement in learning or teaching; and
- fraud – any act or instance of willful deceit or trickery.

Violations of academic integrity will be dealt with by imposing appropriate sanctions. Sanctions for acts of academic dishonesty could include the resubmission of an assignment, failure of the test/exam, failure in the course, probation, suspension from the College, and even expulsion from the College.

Student Code of Conduct:

All students are expected to conduct themselves as responsible and considerate adults who respect the rights of others. Disruptive behavior will not be tolerated. All students are also expected to attend and be on time for all class meetings. No cell phones or similar electronic devices are permitted in class. Please refer to the Essex County College student handbook, *Lifeline*, for more specific information about the College’s Code of Conduct and attendance requirements.

Class Expectations:

Some of the expectations that you, the students, may have of me, the instructor, and some of the expectations that I, the instructor, will have of you, the students, in this class are given below.

You may expect me to:

- Arrive to class on time and be prepared.
- Provide clear instruction.
- Respect you as individuals and encourage you to work hard.
- Grade each test/exam fairly on the quality of your completed test/exam and not on the amount of time and effort you spent preparing for the test/exam.
- Return graded tests in a timely manner.

Class Expectations:
(continued)

I will expect you to:

- Concentrate exclusively on this course during class hours.
- Do not receive or make phone calls or text messages. **TURN OFF all cell phones and other electronic devices** (iPods, MP3s, etc.) before entering the classroom. If you use a cell phone in class, you must leave for the remainder of the class session and see me during my office hours before attending the next class. If you repeatedly forget to turn off your cell phone and it rings and interrupts the class, you must leave for the remainder of the class session and see me during my office hours before attending the next class.
- Arrive to class on time. Late students are responsible for all missed material. If you are repeatedly late, you must see me during my office hours to discuss this matter.
- Come to class prepared. Reviewing notes from the previous class, reading appropriate sections of the textbook, and completing homework will enormously increase your understanding of the math topics covered in this course. It is especially *strongly* suggested that you do the homework in a timely manner!
- Ask questions. Questions should be asked in class or during my office hours. Please ask for help *before* you fall behind.
- Respect me and all of your classmates.
- Call if sick or unable to attend class, especially when a test or exam is scheduled.

Students with Special Needs:

If you are a student with documented disabilities, you are entitled to receive appropriate accommodations as recommended by the Office of Disability Support Services, which will occur once you provide the necessary documentation to this office. It is not enough for you to request such accommodations directly from me. You must contact a counselor in the Office of Disability Support Services, as soon as possible to receive valuable guidance and support. The office is located in Room 1123 and the phone number is 973-877-2186.

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On the following pages is a TENTATIVE class session schedule. This schedule is subject to change at any time. Please be aware of any changes that are announced in class by either contacting a classmate or else by contacting me via e-mail or by phone during my office hours.

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Day / Date	Class Material
T 9/7	Introduction to the class; expectations will be discussed
	CHAPTER 0: FUNCTIONS
R 9/9	0.1 Functions & Their Graphs (# 1,5,7,9,15,21,23,25,27,31,33,35,41,43,46,49,53,55)
F 9/10	0.2 Some Important Functions (# 5,7,15,17,23,29,31,37)
	0.3 The Algebra of Functions (# 1,5,7,11,15,17,25,27,31,33,35)
T 9/14	0.4 Zeros of Functions – The Quadratic Formula and Factoring (# 1,7,13,17,25,29,33,40)
	0.5 Exponents and Power Functions (# 1,10,13,33,41,43,57,63,79,85,87,93)
R 9/16	0.6 Functions and Graphs in Applications (# 1,3,5,7,9,11,13,15,19,21,23,25,33,35,41,43)
	CHAPTER 1: THE DERIVATIVE
F 9/17	1.1 The Slope of a Straight Line (# 1,9,13,15,23,25,27,29,43,47,49,51,53,55)
T 9/21	1.2 The Slope of a Curve at a Point (# 1,3,5,7,9,17,20,27,29,33)
	1.3 The Derivative (# 1,5,9,11,15,17,25,31,35)
R 9/23	1.3 The Derivative (continued) (# 45,49,53,57,65,71,75)
	1.4 Limits and the Derivative (# 1,3,5,7,9,11,17,21,27,29,63)
F 9/24	Test #1 on Sections 0.1 – 0.6 & 1.1 – 1.2
T 9/28	1.5 Differentiability and Continuity (# 1,3,5,13,17,19,21,29)
	1.6 Some Rules for Differentiation (# 3,5,7,9,21,27,41,45,53,57,63)
R 9/30	1.7 More About Derivatives (# 5,13,19,21,25,27,33,35,39,41)
	1.8 The Derivative as a Rate of Change (# 3,7,9,13,27)
	CHAPTER 2: APPLICATIONS OF THE DERIVATIVE
F 10/1	2.1 Describing Graphs of Functions (# 1,2,5,7,11,17,19,25,27,35)
T 10/5	2.2 The First and Second Derivative Rules (# 1,3,5,7,9,11,17,19,23,25,27,31)
R 10/7	2.3 The First and Second Derivative Tests and Curve Sketching (# 3,11,25,33,37,41)
	2.4 Curve Sketching (Conclusion) (# 3,7,9,19,25,31,33)
F 10/8	Test #2 on Sections 1.3 – 1.8 & 2.1 – 2.2
T 10/12	2.5 Optimization Problems (# 3,5,9,11,15,17,21)
R 10/14	2.6 Further Optimization Problems (# 3,5,7,15,17,21)
	2.7 Applications of Derivatives to Business and Economics (# 1,3,5,11)
	CHAPTER 3: TECHNIQUES OF DIFFERENTIATION
F 10/15	3.1 The Product and Quotient Rules (# 3,5,11,17,23,29,33,39,41,45,47,63,65,67)
T 10/19	3.2 The Chain Rule and the General Power Rule (# 1,3,5,7,9,11,13,17,29,33,39,41,45,47,49,53,59)
R 10/21	3.3 Implicit Differentiation and Related Rates (# 3,9,11,19,25,31,37,39,41,43,45)

Day / Date	Class Material
	CHAPTER 4: THE EXPONENTIAL AND NATURAL LOGARITHM FUNCTIONS
F 10/22	4.1 Exponential Functions (# 1,7,9,15,17,21,23,27,31,37,39)
	4.2 The Exponential Function e^x (# 3,5,11a,13,17,19,21,23,25,27,29,31,37,39,43)
T 10/26	Test #3 on Sections 2.3 – 2.7 & 3.1 – 3.3
R 10/28	4.3 Differentiation of Exponential Functions (# 3,5,13,15,17,23,27,33,35,39)
F 10/29	4.4 The Natural Logarithm Function (# 1,3,5,7,11,13,17,19,21,23,27,31,39,41,45,47)
T 11/2	4.5 The Derivative of $\ln x$ (# 1,3,7,15,17,19,21,25,31,33)
R 11/4	4.6 Properties of the Natural Logarithm Function (# 1,3,5,9,12,15,19,21,23,27,29,31,33,39,41,43,45,53)
	CHAPTER 5: APPLICATIONS OF THE EXPONENTIAL AND NATURAL LOGARITHM FUNCTIONS
F 11/5	5.1 Exponential Growth and Decay (# 1,3,5,7,13,15,25)
T 11/9	Test #4 on Sections 4.1 – 4.6
R 11/11	5.2 Compound Interest (# 1,3,7,9,11,15,19)
F 11/12	5.3 Applications of the Natural Logarithm Function to Economics (# 1,3,9,11,13,19,21)
	CHAPTER 6: THE DEFINITE INTEGRAL
T 11/16	6.1 Antidifferentiation (# 1,3,5,7,13,15,17,19,21,27,29,31,39,43,45,49,55,57,59,65)
R 11/18	6.2 Areas and Riemann Sums (# 1,5,7,9,11,15)
F 11/19	(Last Day to Withdraw!!) 6.3 Definite Integrals and the Fundamental Theorem (# 1,3,5,7,13,19,25,29,33,35,37,39,41)
T 11/23	6.4 Areas in the xy -Plane (# 3,7,9,11,13,17,21,27) Take-Home Test #5 on Sections 5.1 – 5.3 & 6.1 – 6.3 distributed in class
R 11/25	no class today – school is closed for Thanksgiving Break
F 11/26	no class today – school is closed for Thanksgiving Break
T 11/30	Take-Home Test #5 on Sections 5.1 – 5.3 & 6.1 – 6.3 due (<u>NOTE</u> : Take-home tests will not be accepted for any reason after today.)
	6.5 Applications of the Definite Integral (# 1,7,13,17,21,25,29,33,35)
	CHAPTER 7: FUNCTIONS OF SEVERAL VARIABLES
R 12/2	7.1 Examples of Functions of Several Variables (# 1,3,7,11,13,17,23–26)
F 12/3	7.2 Partial Derivatives (# 1,3,5,7,11,13,17,21,23,25a,27)
T 12/7	7.3 Maxima and Minima of Functions of Several Variables (# 1,3,9,11,15,17,21,27,31)
R 12/9	7.4 Lagrange Multipliers and Constrained Optimization (# 1,3,7,9,11,17,23)
F 12/10	Test #6 on Sections 6.4 – 6.5 & 7.1 – 7.3 (Questions on Section 7.4 for extra credit only)

Day / Date	Class Material
T 12/14	Review for Final Exam
R 12/16	Comprehensive <u>Final Exam</u> on all course material covered
F 12/17	Last day of class – individual discussion of final exam scores and course grades