Math 119 - Business Calculus
Oxford College of Emory University
Spring 2012

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Course Description: Mathematics 119 covers topics from Calculus with an emphasis on applications to and examples from Business and Economics. Topics covered include: functions, limits, continuity, the derivative, product and quotient rules, the chain rule, marginal analysis and approximations, curve sketching, maxima/minima problems, exponential and logarithm functions, derivatives of exponential and logarithmic functions, integration and applications, trigonometric functions, derivatives and integrals of trigonometric functions.

Mathematics 119 is a beginning course. No prior exposure to calculus is needed! A good solid background in pre-calculus (algebra, logarithms and exponents, and trigonometry) is extremely important.

Course Goals: Upon successful completion of Math 119 students will:

1. Understand conceptually limits and their relationship to the graph of a function.
2. Understand conceptually the derivative and its relationship to the concept of "rate of change".
3. Understand conceptually the definite integral and its relationship to area and volume.
4. Be able to calculate derivatives, evaluate limits, and compute integrals (both definite and indefinite).
5. Be able to apply the notions of calculus to problems in business and economics.
6. Be well-prepared for Math 112.

Classes: The student is responsible for what is covered in class. In addition to the regular class meetings, there will also be several tests scheduled on Tuesday or Thursday mornings. (See below).

Textbook: Laurence D. Hoffmann & Gerald L. Bradley, *Applied Calculus for Business, Economics, and the Social and Life Sciences, Expanded Edition, McGraw Hill, Tenth Edition.* Try to read the book before coming to class: believe me, this is a very useful habit.

Homework: A homework is assigned almost every day of class at the end of class. These exercises usually will not be collected but are for the benefit of the student. Students may ask questions, and quizzes based on the homework may be given. The instructor may ask to see a student's homework.

Weekly Problems: (50 points.) Three problems will be assigned every monday and their solutions will be collected in the following monday to be graded. Each student is responsible to provide thorough solutions to these problems. These solutions should be neatly written and explain with some details all the steps taken to arrive at the final answer. Sample solutions are posted at Blackboard as a guide on how to write your own solutions. After grading, I will select the best solutions to post on Blackboard. You are NOT to discuss your solutions with another student or seek help from anyone besides your instructor.

Quizzes: (70 points.) All quizzes may be announced and are usually in-class. The student must be present in class to take each quiz. Up to one quarter of the quizzes will be dropped. Each quiz will count the same amount, the average per cent being used to calculate the number of points. For example, a 94% quiz average

at the end of the course will result in 66 points out of the 70. Normally an excused absence during which a student misses a quiz may not be made up; it will be dropped.

Gateway Exams: (50 points.) In order to pass the course, the student must pass an examination on differentiation. All 50 points will be given for a perfect paper. If the student has one mistake or less, the student passes the Gateway and receives a score of 30 points for one mistake. The student will be allowed three opportunities to pass it. Each test will be different but very similar to the original test.

8:00 am	**Thursday, March 1st**
8:00 am	**Thursday, March 29th**
8:00 am	**Tuesday, April 17th**

Project(s): (50 points.) At least one group project will be assigned during the semester. The groups will consist of two or three people.

Tests: (330 points.) In general, calculators will not be allowed on tests. Three tests will be given on the following days:

- **8:00 am, Thursday, February 16th - Test 1 (110 points)**
- **8:00 am, Thursday, March 22nd - Test 2 (110 points)**
- **8:00 am, Thursday, April 26th - Test 3 (110 points)**

Final Exam: (250 points.) A cumulative final exam will be given at the time scheduled by the Registrar.

Grading: Evaluation will be based on the following written work:

Gateway Exams	50 points
Tests (3 @ 110 pts)	330 points
Problems	50 points
Quizzes	70 points
Projects	50 points
Final	250 points
Total	800 points

The plus/minus system will be used with the following rough guide to letter grades:

A	B	C	D	F
720 points and up	640 - 719 points	560 - 639 points	480 - 559 points	below 480

Also, I reserve the right to amend, append, or otherwise make changes to the plan for the course.

Excuses: Excuses deemed legitimate by the instructor will be handled according to the individual circumstances and college policies.

The student is expected to take all tests and exams at the scheduled times. For legitimate excuses arrangements will be made to take a test prior to the testing time. There will be no make-up tests given after the testing time.

Written Style: Thoughts are expressed by sentences: just so in mathematics. Pay attention to your textbook: it is written in sentences. Your written work must be in complete sentences. Note "1+1 = 2" is a complete sentence (it has a subject "1+1", verb "=" and predicate "2"). Use mathematical symbols wherever appropriate. Your work also needs to be neat and orderly to be intelligible. See the "Calculus Style Guide" on Blackboard.

Tips for Success: Calculus is hard, but it can be made easier by intelligent and efficient study habits. Gauss said the purpose of calculation is insight. Insight is an understanding into why things work the way they do. This should be the goal of working out problems. Know **why** each step is correct and **why** each step was the right step to take. This is more than knowing **that** each step is correct.

Although the homework exercises are not graded, it is important for the success of the student that they be completed as soon after covering the material as possible. Calculators may be used when appropriate, but the student should keep in mind that they are not permitted on the tests. While collaboration is encouraged, each student should be sure that he or she ultimately can **solve problems unaided by notes, the textbook, a calculator, or other people**.

Practice good style on homework. A clean style helps to clean up messy thinking.

In general the student will need to study at least six good hours per week exclusive of the time spent on case studies and review for tests.

Tests are performances, similar to those by athletes, musicians, and dancers. Prepare for them in similar ways. Begin practicing for them weeks in advance.

The topics we will cover are very useful and fundamental in the sciences, business and engineering, among other fields, and I want you all to succeed. However, success in the course will require your diligence and hard work. Be sure to keep up with the assignments and to attend class. Talk to me as soon as you are having problems - don't wait until the week of a test. In addition to learning quantitative skills, it is important that you develop learning skills and study habits that will help you in calculus, in other courses, and in life beyond Oxford College.

SI/Help Sessions/Tutoring: The SI program is a program of optional, organized study sessions. The sessions are not meant to be tutoring sessions. The supplemental instructor (SI) is a student who has taken the course (or a similar course) before, has a good understanding of the material (but probably not as complete as the instructor!), and knows how to be a successful student.

Help sessions will be scheduled as there is demand for them. Attendance is optional.

The schedule for tutoring in the Math Center will be announced when available.

Honor Code: The Honor Code of Oxford College applies to all work submitted for credit in this course. To receive credit for work submitted you must place your name on it. By placing your name on such work, you pledge that the work has been done in accordance with the given instructions and that you have witnessed no Honor Code violations in the conduct of the assignment.

You may always ask the instructor any question about an assignment. He will answer at his discretion.

Good luck and I hope this will be an enjoyable experience for all of you!

Student work submitted as part of this course may be reviewed by Oxford College and Emory College faculty and staff for the purposes of improving instruction and enhancing Emory education.

Tentative Calendar:

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 16th **1**	Jan 17th	Jan 18th **2** §1.1 - 1.4 Review of Functions & Mathematical Modeling	Jan 19th	Jan 20th **3** §4.1 Review of Exponential & logarithmic functions
Jan 23rd **4** §1.5 Limits	Jan 24th	Jan 25th **5** §1.5 - 1.6 Limits & Continuity	Jan 26th	Jan 27th **6** §1.6 Continuity & IVT
Jan 30th **7** Limits of trigonometric functions	Jan 31st	Feb 1st **8** §2.1 Derivative Tangent Lines and velocity	Feb 2nd	Feb 3rd **9** §2.2 Derivative Rules
Feb 6th **10** §4.3, 11.2 Derivative Rules: Transcendental Functions	Feb 7th	Feb 8th **11** §2.3 Product & Quotient Rules	Feb 9th	Feb 10th **12** §2.4 Chain Rule
Feb 13th **13** §2.4 Chain Rule (cont.)	Feb 14th	Feb 15th **14** Review Test 1	Feb 16th **8:00** **Test 1**	Feb 17th **15** §2.5 Application of derivatives: Marginal Analysis
Feb 20th **16** §2.6 Implicit Differentiation & Logarithmic differentiation	Feb 21st	Feb 22nd **17** §2.6 Related Rates	Feb 23rd	Feb 24th **18** §2.6 Related Rates (cont.)

Monday	Tuesday	Wednesday	Thursday	Friday
Feb 27th **19** §1.5 Infinite limits & Limits at infinity	Feb 28th	Feb 29th **20** §3.1 - 3.3 Curve Sketching: Increasing & decreasing functions	Mar 1st **8:00** **Gateway Exam** **First Try**	Mar 2nd **21** §3.1 - 3.3 Curve Sketching: Concavity
Mar 5th **22** §3.1 - 3.3 Curve Sketching: Examples	Mar 6th	Mar 7th **23** §3.1 - 3.3 Curve Sketching: Vertical Tangents	Mar 8th	Mar 9th **24** Last day for dropping. §4.2 Compound Interest
Mar 12th *Spring Break*	Mar 13th	Mar 14th *Spring Break*	Mar 15th	Mar 16th *Spring Break*
Mar 19th **25** §4.4 Exponential Models	Mar 20th	Mar 21st **26** Review Test 2	Mar 22nd **8:00** **Test 2**	Mar 23rd **27** §3.4 Optimization
Mar 26th **28** §3.5 Elasticity of Demand	Mar 27th	Mar 28th **29** §3.5 Max/Min Problems	Mar 29th **8:00** **Gateway Exam** **Second Try**	Mar 30th **30** §5.1 Antiderivatives
Apr 2nd **31** §5.2 Substitution Rule	Apr 3rd	Apr 4th **32** §5.2 Substitution Rule (cont.)	Apr 5th	Apr 6th **33** Sigma Notation & Mathematical Induction
Apr 9th **34** Mathematical Induction (cont.)	Apr 10th	Apr 11th **35** §5.3 Riemann Sums and Definite Integral	Apr 12th	Apr 13th **36** §5.3 Fundamental Theorem of Calculus
Apr 16th **37** §5.4 Applications of Definite Integrals: Area between curves	Apr 17th **8:00** **Gateway Exam** **Last Try**	Apr 18th **38** §5.5 Applications of Definite Integrals: Business & Economics	Apr 19th	Apr 20th **39** §5.6 Applications of Definite Integrals: Volume of revolution

Monday	Tuesday	Wednesday	Thursday	Friday
Apr 23rd **40** §5.6 Applications of Definite Integrals: Volume of revolution (cont.)	Apr 24th	Apr 25th **41** Review Test 3	Apr 26th **8:00** **Test 3**	Apr 27th **42** Final Review
Apr 30th **43** Final Review	May 1st *Last day of classes*	May 2nd *Reading Day*	May 3rd	May 4th **44**