# **Mathematics 111**

Fall, 2003

**Textbook:** Larson, Hostetler and Edwards, Calculus of a Single Variable: Early

Transcendental Functions, D. C. Heath and Company, 3<sup>rd</sup> edition

**Instructors:** Dr. Evelyn C. Bailey

Office: Seney 303 Phone: 4-8317

**Office Hours:** In general, Tuesday and Thursday from 10:00 until 12:00; Monday and

Wednesday from 2:00 until 3:30.

**Course Content**: Mathematics 111 is the first semester of introductory calculus. Course content includes limits; continuity; the derivative; differentiation of algebraic, trigonometric, and the natural logarithmic and exponential functions; applications of derivatives; antiderivatives; the definite integral; simple integration by substitution; and applications of the definite integral. A list of specific topics by day is given below.

**Goals:** By the completion of this course, the student should have a basic understanding of the following: (1) limits and their relationship to the graph of a function; (2) the derivative and its relationship to the graph of a function and to the concept of "rate of change;" and (3) the definite integral and its relationship to area and volume. The student should be able to calculate derivatives and to evaluate limits and integrals (both definite and indefinite). The primary purpose of this course is to provide a solid foundation for success in Mathematics 112 since both Mathematics 111 and 112 provide the student with a year of college calculus.

Class Attendance: The student is responsible for the course material discussed in class; therefore the student is expected to attend all classes. An inordinate number of absences will be handled in accordance with the College's policies. Students should make every effort to attend class on days in which quizzes are given out. (See "Quizzes" below.)

**Homework:** Homework assignments are for the student's benefit and will not be collected. It is important, however, that the student thoughtfully complete most of the problems assigned. The student will need to spend at least <u>6 good hours</u> of study each week, not counting time spent taking quizzes, reviewing for tests, and preparing the graphing portfolio.

Calculators: Calculators will not be needed or allowed on tests or quizzes.

**Gateway Exam:** In order to pass this course, the student must pass an examination on derivatives. All <u>50 points</u> will be given for a perfect paper. There will be five opportunities for the student to earn all 50 points. If the student has only ONE mistake, the student may choose to get a score of <u>35 points</u> and not retest. More than ONE mistake is not considered a passing grade. The Gateway Exam will be given on <u>Tuesday</u>, <u>September 23</u>. Retest dates are Tuesday, October 7; Thursday, October 16; Tuesday, October 28 and Tuesday, November 11. Example exams will be provided.

**Quizzes**: All quizzes are announced (Please see "Course Calendar" below.) and "take home." A student must be present in class to receive a quiz. Students must complete quizzes during one sitting and use only authorized materials (pencil, paper, and any reference material specifically

authorized for a given quiz). Quizzes are due at class time on the class day following their assignment. If you are not in class when a quiz is given out, you generally cannot receive a copy of the quiz; however, exceptions to this policy are sometimes permitted on an emergency basis.

Each quiz will be graded on a basis of 25 points. Twelve quizzes will be used in the determination of the student's grade, as follows: the best <u>ten</u> scores on Quizzes 1-13, the scores on Quizzes 14 and 15 cannot be dropped.

**Major Tests**: Three tests will be given at 8:00 a.m. as follows: Test 1 on <u>Tuesday, September 30</u>; Test 2 on <u>Tuesday, October 21</u>; and Test 3 on <u>Tuesday, November 20</u>. Students are expected to take tests at the scheduled times. Conflicts, problems and emergencies will be handled on an individual basis. For reasons deemed legitimate by your professor, arrangements may be made for a student to take at test <u>prior to the testing time</u>. Any student who needs special accommodations must provide documentation several days in advance of the needed accommodation so that appropriate arrangements may be made.

Graphing Portfolio: You are to use software (GRAPHMATICA) available in the computer labs to prepare a portfolio of computer-generated graphs. The portfolio is to contain at least 15 distinctly different displays of graphs. Each function is to be clearly identified by the formula. Use only algebraic, trigonometric (including inverse trigonometric), logarithmic and exponential functions or combinations of them. The student must have at least three graphical displays where the important features of the graphs are clearly labeled (maximum, minimum, inflection points, etc.) The Curve Sketching Checklist (provided during the graphing section of this course) should be used to determine what graphing aspects should be labeled. These are the technical graphs. The remaining graphs should be linked by a theme and should combine several functions to make picture displays. These are the thematic graphs.

Student may receive help with the use of the computer and software, but students must choose their own functions and create their own printouts and portfolio. Evaluation of the portfolio will be made on the selection of graphs, the documentation associated with the graphs, the completeness of the technical graphs, the creativity of the thematic graphs, and the oral presentation of the portfolio. Accuracy, clarity, organization and originality are important in the finished product. This assignment is due on Monday, November 3 at class time. Oral presentations will be given on Monday, November 3 and, if needed, on Wednesday, November 5.

**Grading**: The student's final course grade will be determined as follows:

Major tests (3 @ 100 points)	300 points
Quizzes (12 out of 15, as noted above)	300 points
Graphing Portfolio	175 points
Final Exam	225 points
	1000 points

In general, letter grades will be determined as follows:

A: 900 or more pointsB: 800-899 pointsC: 700-799 pointsD: 600-699 pointsF: fewer than 600 points

Grades of A-, B+, B-, C+, C-, D+ may be assigned for sums of points near the above cut-off totals. For example, a B+ could be assigned for a sum of 891 points. In addition, the assignment of plus and minus is dependent on the overall class distribution of sums of points.

**Scheduled Help Outside Class**: Renee Williams, Rachel Leigh, Kunal Sharma and Jessica Cohen are SI leaders for Math 111 this semester. They will schedule sessions outside of class for students. At night in the Gregory Room, student tutors are available to help with homework problems. A schedule of tutoring hours will be provided early in the semester.

There is a class conference on Learnlink, Math 111. Announcements from your SI leaders and from your instructor will be posted there. Students may ask questions and make requests on this conference.

# **Summary of Important Dates:**

September 1	Labor Day
September 23	Gateway Test at 8:30, S310, S322
September 30	Test 1 at 8:00, S310, S322
October 7	Gateway Re-test at 8:30, S310, S322
October 13, 14	Mid-semester break
October 16	Gateway Re-test at 8:30, S310, S322
October 21	Test 2 at 8:00, <b>S208, S209</b>
October 28	Gateway Re-test at 8:30, S310, S322
November 3	Graphing Portfolio Due
November 3, 5	Oral Presentations, Graphing Portfolio
November 11	Last Gateway Retest
November 20	Test 3 at 8:00, S310, S322
November 26, 28	Thanksgiving Break
December 3	Receive quizzes 12 and 13 (required)
December 8	Last Class Day
December 9	Reading Day

**Written Style:** Neatness is one way of showing courtesy toward your instructor and pride in your work. Thoughts in mathematics are expressed in sentences, such as "1+1=2". There is a subject "1+1", a verb "=", and a predicate "2". Remember that "=" should not be treated as a comma ",". The student should strive to be neat and to use mathematical symbols appropriately.

THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE. BY YOUR SIGNATURE ON SUCH WORK YOU PLEDGE THAT WORK WAS DONE IN ACCORDANCE WITH THE RULES STIPULATED ON THE WORK OR IN THIS SYLLABUS.

#### **Calculus Survival Guide**

- 1. **How much to study:** Calculus is a hard subject. It is likely that it will be your most challenging course this semester. You should be spending 10 to 15 hours a week studying calculus. If you need to make adjustments in your academic or work schedules, do so now. If you cannot make this level of time commitment this semester you will likely be better off taking calculus at another time.
- 2. **How to study:** Calculus texts are odd books. They are not meant to be read like a novel, or even like a history or biology text. Your calculus should be read in a series of passes. On the first pass through a section, which should be done **before** the lecturer covers it, the student should skim through it lightly, reading definition and theorems, and trying to **work** through some of the examples. But, and this is key, you won't fully understand much of what you've read until you start working on the exercises. In fact, you should spend most, perhaps **80%**, of your study time working problems. As you get stuck, you go back, rereading the section, studying the examples and derivations, on a "need-to-know" basis.
- 3. **Homework:** Work lots and lots of problems, not just the ones assigned as homework. If you are done with the current section, go back and work review problems. Furthermore, you are not done with a problem just because you got the right answer. You are only done when you understand **why** the methods you used had to have worked. If all you are doing is blindly applying formulas and mimicking examples, get extra help. The problems should make sense to you.
- 4. **Studying for tests:** If you were an athlete preparing for track meet, and you slacked off during the weeks before the meet, doing just what you needed so coach wouldn't get on your case, and then stayed up running the whole night before your meet, you'd loose. Yet this is just how many students prepare for exams. The right way to study for a test, is to do your work at a steady pace throughout the semester. The point is, that while there are a few facts and formulas you'll need to remember for a test, the real way to do well is to think well. That is, you want your brain to be in top shape. You cannot achieve that by cramming. It is now known that as you learn the brain slowly rewires itself. As you study, you *gradually* get smarter. That is the whole point of college!
- 5. **Come to class:** Many college students treat class attendance as optional. This may be fine for some classes. However, for calculus you can get way behind very fast. You should come to class every period unless you are seriously ill.

# **Mathematics 111**

Fall, 2003

# **Class Calendar**

with

# Homework Assignments from the Textbook and

# Ouiz Dates

**NOTES**: 1) All tests (except test 2) given in Seney 310 and 322; 2) Handouts are on e-Reserves, see class conference for these and bring them to class as needed.

#### Wednesday, August 27

Review of Functions [P];

p. 8: 1-4, 37, 41, 47, 49, 51, 53

p. 16: 1, 3, 7, 9, 15, 19, 23, 31, 35, 39

p. 27: 1, 7, 13, 15, 29, 51

p. 43: 1, 3, 5, 7, 47, 53, 57, 59, 91, 95, 107

p. 52: 1, 3, 5, 7, 9, 13, 19, 21, 25, 27, 39, 41, 49, 51, 53, 63, 67, 71, 75, 77

p. 54: 1, 7, 13, 17, 19, 21, 25, 34, 35, 36, 51, 53, 57, 59, 61, 63

p. 56: 1, 5, 7, 9

Friday, August 29

Introduction to

Calculus [1.1]; Limits [1.2]

p. 72: 11, 13, 15, 17; Finish any previous

# Labor Day Holiday - Monday, September 1

#### Wednesday, September 3

**Limits** [1.3]

p. 83: 5-43 odd, 51-61 (odd)

#### Friday, September 5

Continuity [1.4]

p. 94: 1-19 (odd), 25-27 (odd), 63, 65

# Monday, September 8

Intermediate Value Theorem [1.4]; [Infinite limits [1.6] later in course]

p. 96: 91-94 (all)

p. 106: 7-10 (all), 15-26 (all), 44-57 (all)

p. 108: 4, 5, 6, 9

Quiz 1

## Wednesday, September 10

Definition of Derivative, Tangent Line Problem, Differentiability [2.1]

p. 20: 5-23 (odd), 33, 35, 39-42 (all), 47, 71-86 (all)

## Friday, September 12

Basic Rules of Differentiation (the constantmultiple, sum, and difference rules; derivatives of powers, transcendental functions)

p. 132: 3-23 (odd), 39-51 (odd), 57-61 (odd), 91-94 (all), 101, 102, 109, 111

# Monday, September 15

Product and Quotient Rules, Higher Order Derivatives [2.3]

p. 143: 3,4,5-15 (odd), 23-53 (odd), 69, 71, 73, 75, 83-93 (odd), 103, 105 **Quiz 2** 

# Wednesday, September 17

Chain Rule [2.4]

p. 156: 9-35 (odd), 47-54 all, 55-93 (odd), 101-106 (all), 149, 151

# Friday, September 19

#### **Review of Differentiation**

p. 190: 1-10 (all), 17-32 (all), 37, 41-57 (all), 59-62 (all), 67-96 (all), 97-114 (all), (and w/o a calculator).

Quiz 3

Monday, September 22

**Review** 

Tuesday, September 23

Gateway Exam 1 at 8:30

Wednesday, September 24

Implicit Differentiation [2.5]; Derivatives of Arcsine and Arctangent functions [2.6]

p. 166: 1-38 (all), 41-46 (all), 65-68 (all), 75, 76 p. 171: 13, 14, 17, 18, 19, 20, 22, 31, 33, 34, 35, 40

#### Friday, September 26

#### Related Rates [2.7]

p. 180: 1-4 (all), 9, 10, 15, 18, 19, 20, 21, 22, 23, 24, 27, 28, 30, 31, 32, 33, 34, 35, 36, 39, 43

p. 191: 119-130(all) no calculators, 137, 138, 141, 144, 147, 148

p. 194: 4, 9 **Quiz 4** 

Monday, September 29

**Review** 

Tuesday, September 30

Test 1 at 8:00

Wednesday, October 1

Extrema on an Interval [3.1] Mean Value Theorem [3.2]

p. 203: 7-10, 11-38 (odd), 59-62, 66 p. 210: 7-21 (odd), 35-43 (odd), 53, 54 Friday, October 3

**Graphing Concepts [3.3, 3.4] with Application** 

to Polynomial Functions

Graphing handout

Monday, October 6

**Infinite Limits [1.6]** Limits at Infinity [3.5]

**Graphing Handout** 

Quiz 5

Tuesday, October 7

Gateway Exam 2 at 8:30

Wednesday, October 8

**Graphing Rational Functions [3.6]** 

Graphing handout

Friday, October 10

**Graphs with Vertical Tangents, Other Types** 

of Graphs [3.6]

Graphing handout

Quiz 6

Fall Break - October 13, 14

Wednesday, October 15

**Review Differentiation and Graphing** 

Thursday, October 16

Gateway Exam 3 at 8:30

Friday, October 17

More Graphs

Quiz 7

Monday, October 20

Review

Tuesday, October 21

Test 2 at 8:00 – Seney 208, 209

Wednesday, October 22

**Optimization** [3.7]

p. 256: 2-10 (all), 17, 18, 19, 23, 24, 26, 27, 29, 33, 37, 38, 43

p. 271: 80, 81

Friday, October 24

**Optimization continued....** 

Quiz 8

Monday, October 27

**Antiderivatives [4.1]** 

p. 283: 15-44 (odd), 73-79 (all), 87

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Tuesday, October 28	Gateway Test 4 at 8:30
Wednesday, October 29	Sums and Sigma Notation [4.2]
p. 295: 7-14 (all) Induction handout	Induction
Friday, October 31	Induction continued
Monday, November 3	Graphing Portfolios due; presentations
Wednesday, November 5	Review; presentations
Quiz 9	
Friday, November 7	Definite Integral, Area [4.3] Fundamental Theorem of Calculus [4.4]
p. 306: 3, 5, 7, 15, 17, 19, 23-28, 31, 32, 33, p. 318: 5-37 (odd), 41-49 (odd), 85-109 (odd)	
Monday, November 10	Integration by Substitution [4.5]
p. 331: 7-38 (odd), 45-75 (odd)	
Tuesday, November 11	Last Gateway Test!!!
Wednesday, November 12	More Substitution [4.7, 4.8]
p. 348: 1-35 (odd) p. 355: 1-43 (odd)	
Friday, November 14	Introduction to Differential Equations Separation of Variables [5.1, 5.2]
p. 379: 1-9 (all) p. 392: 1-6 (all), 33-68 (odd)	
Monday, November 17	Review
p. 367: 3-11 (odd), 21, 37-51 (odd), 63-79 (a <b>Quiz 11</b>	all), 97-114 (all)
Wednesday, November 19	Review
Thursday, November 20	Test 3 at 8:00 a.m.
Friday, November 21	Area Between Curves [6.1]

p. 418: 1-6 (all), 15-30 (odd), 41, 43, 45

Monday, November 24

**Volumes of Revolution - Disk Method [6.2]** 

p. 428: 1-22 (all), 23-32 (odd)

Thanksgiving Break - November 26-28

Monday, December 1

**Volumes of Revolution - Shell Method [6.3]** 

p. 437: 1-20 (all)

p. 476: 1-10 (all), 21-28 (all)

Wednesday, December 3

**Review of Area and Volume** 

Quizzes 12 and 13 (REQUIRED) and due Class Time on December 5

Friday, December 5

**Course Review & evaluation** 

Monday, December 8

**Last Class Day Discuss Final** 

Final Examinations will be given in Seney 209 at the designated exam scheduled time.