Mathematics 112
Fall, 1998

Textbook: Larson, Hostetler, Edwards, Calculus

Instructor: Dr. Evelyn C. Bailey, Office in Seney 115D

Content: Mathematics 112 is the second semester of calculus and is designed specifically for students who have completed a semester of college calculus (Math 111 or Math 111T). Course content includes a review of limits, differentiation, integration (substitution), and graphing using algebraic and transendental functions; and includes methods of integration, improper integrals, polar coordinates, sequences and infinite series, and power series, and introduction to differential equations. Specific topics by class day is attached.

Goals: (1) Students should have a basic understanding of derivative, of antiderivative, and of limit (from Math 111). (2) Students should be able to use the rules of differentiation as they apply to algebraic and transcendental functions. (3) Students should be able to evaluate a variety of limits. (4) Students should be able to sketch graphs of transcendental functions, by building on concepts from Math 111. (5) Students should be able to demonstrate appropriately the methods of integration (substitution, parts, trigonometric substitution, partial fractions) and use these methods with typical indefinite, definite, and improper integrals. (6) Students should be able to graph and to find area using simple polar coordinate expressions. (7) Students should be able to determine convergence of appropriate infinite series by giving logical arguments. (8) Students should have a basic understanding of power series and be able to determine the domain of appropriate power series. (9) Students should be able to derive a power series expression for certain transcendental expressions using a geometric series or Taylor's Theorem. (10) Students should be able to use technology to produce appropriate graphs of variations on functions typically used in this course. (11) Students should be able to solve simple first-order differential equations.

Grading: The final course grade will be determined as follows:

Major tests (3 @ 100 points)	300 points
Quizzes (best 8 @ 25 points)	200 points
Graphing Portfolio	200 points
Final Exam	200 points
	900 points

In general,
   A, A-: 810 points and above
   B+, B, B-: 720-809 points
   C+, C, C-: 630-719 points
   D+, D: 540-629 points
   F: below 540 points

<u>Major Tests/Final Exam</u>: Three major tests will be given at 7:45 a.m. on the following mornings: September 22, October 22, November 24. The final exam will be comprehensive.

<u>Quizzes</u>: All quizzes are announced and "take home"; however, you must be present in class to receive your quiz. You must work each quiz at <u>one setting</u> and use only the reference sheet provided for this course. There should be no discussion of quizzes until <u>after</u> they are turned in for grade. Quizzes are due at class time on the class day following your receipt of them. Each quiz is worth 25 points and the best eight quizzes will be used to help determine your grade.

<u>Computer Project</u>: Using Graphmatica in the computer laboratory in Pierce Hall, you are to prepare a portfolio of computer printouts showing a <u>minimum of fifteen</u> distinctly different graphs. Each function needs to be clearly identified. You must give the important aspects of graphing by labeling these aspects on <u>no fewer than three graphs</u>. Your portfolio should include a variety of functions (algebraic, transcendental and Polar Coordinates). You may wish to compose functions to produce pictures or art and/or you may want a theme or story for a set of your graphs. Accuracy, clarity, organization, and originality are important in your portfolio. Up to 100 points is given for the technical aspects and up to 100 points for your original theme and graphs. Due Friday, November 13, class time.

<u>Homework</u>: Homework assignments and specific topics included in this course are attached. Assignments will not be collected but are for your benefit. It is important that you successfully complete a majority of the problems assigned. You will need to spend at least 2 productive hours of study for each class session. Do not get behind or wait until the night before a test to study.

<u>Tutoring and Supplemental Instruction</u>: Student tutors will be available to help with homework problems. A schedule giving specific times is forthcoming. Tutors will be located in the Gregory room during evening hours. Use student tutors only at their appointed times. The SI leader for Math 112S, Mia Skenes, will schedule several optional study sessions to review calculus concepts, to help you discover how best to study calculus, and to orient you to the use of computers in the laboratory.

<u>Attendance</u>: You are expected to attend all classes since you are responsible for work covered in class. An inordinate amount of absences will be handled in accordance with school policies.

You are expected to take tests at the scheduled times. Any conflicts or problems will be handled on an individual basis. If the excuse is considered legitimate by your instructor, arrangements will be made to take a test <u>prior</u> to the testing time. Emergencies will be handled on an individual basis.

Summary of Important Dates:

September 7	Labor Day
September 22	Test 1
October 12, 13	Midsemester Break
October 22	Test 2
November 13	Computer project due
November 24	Test 3
November 25-29	Thanksgiving break
December 7	Last Class Day
December 9	Reading Day

HONOR CODE: THE HONOR CODE OF OXFORD COLLEGE APPLIES TO ALL WORK SUBMITTED FOR CREDIT IN THIS COURSE, AND ALL SUCH WORK WILL BE PLEDGED TO BE YOURS AND YOURS ALONE. THIS INCLUDES THE TESTS, QUIZZES AND THE COMPUTER PROJECT.

Specific Topics and Homework Assignments

Wednesday, August 26   Review functions (exponential, logarithmic, inverse trigonometric)

p. 33: 5, 9, 15, 17, 19
p. 46: 61, 65
p. 56: 3, 5, 9, 19, 43, 47, 59, 71-76 all, 89-97 odd
p. 64: 1, 5, 9, 15, 19, 21, 23, 35-49 odd

Friday, August 28   Review limits

p. 79: 9-17 odd
p. 84: 1, 3, 11, 27
p. 92: 9, 13, 15
p. 102: 1, 3, 5, 9, 11
p. 111: 1, 3, 5, 7, 11, 15, 21, 29, 33, 35, 37, 39
p. 112: 9, 13, 19
p. 215: 1-8 all, 11, 13-31 odd

Monday, August 31   Limits with transendental functions

[Class Notes]
handout

Wednesday, September 2   L'Hôspital's Rule (7.7)

     p. 532: 1-26 all, 27-40 all
     finish previous homework
     QUIZ 1

Friday, September 4   Review

NOTE:
     Monday, September 7 is Labor Day

Wednesday, September 9   Differentiation

     p. 123: 9, 13, 15
     p. 134: 13, 15, 33, 39, 45, 49, 51, 53, 57
     p. 145: 17, 23, 25, 27, 31-47 odd, 49, 51, 57, 59, 61, 63, 75, 79
     p. 155: 11, 15, 21, 23, 25, 27, 29, 43, 45, 47, 49, 53, 59, 61, 65, 69, 73, 79, 83,
            87, 89, 91
     p. 163: 1-19 odd, 21, 25, 27, 31, 41, 43, 45, 53, 55
     p. 330: 3-21 odd
     p. 337: 11-27 all
     QUIZ 2 (WEDNESDAY)

Friday, September 11   Graphing polynomials, rational functions

     [Class Notes and 3.6]
     p. 223: 3, 7, 15, 17, 19, 31, 35, 37, 39, 51, 53
     QUIZ 3

Monday, September 14   Graphing logarithmic and exponential functions

     CLASS NOTES

Wednesday, September 16) Review integration
Friday, September 18   ) (Substitution)

     p. 301: 5, 11, 21, 25, 31
     p. 313: 5, 11, 13, 19, 21, 23, 37, 39, 45, 49, 55, 57, 59, 61-77 odd
     p. 341: 5, 7, 13, 15, 17, 21, 23, 25, 29, 31, 41, 45, 49, 57, 59
     p. 356: 1, 3, 5
     p. 368: 31-47 odd, 51, 53
     p. 386: 1-43 odd, 45, 47
     QUIZ 4 (WEDNESDAY)

Monday, September 21   Review

Test 1 on September 22 at 7:45 a.m.

Wednesday, September 23   Substitution method of integration (7.1)

    p. 476: 1-59 odd

Friday, September 25 Integration by Parts (7.2)

    p. 486: 1-29 odd, 31-42 all, 47, 53, 54, 55, 56, 57, 61, 63, 69

Monday, September 28   More Substitution (7.3)

    p. 496: 5, 9, 15, 19, 21, 27, 29, 35, 39-47 odd, 49-56 all, 67

Wednesday, September 30   Trigonometric Substitution (7.4)

    p. 506: 5, 7, 11, 15, 19-46 all, 51
QUIZ 5

Friday, October 2   Partial Fractions (7.5)

    p. 517: 7-25 odd, 31, 33, 43-48 all

Monday, October 5   ⎫   Improper Integrals (7.8)
Wednesday, October 7 ⎬

    p. 543: 1-6 all, 7-31 odd, 33, 34, 55, 59, 61, 62
    p. 545: 1, 5, 7, 9, 11-35 odd, 37, 39, 45, 47, 49
QUIZ 6 (MONDAY)

Friday, October 9   Review Differentiation

    QUIZ 7

Monday, October 12 is part of mid-semester break

Wednesday, October 14 ⎫   Polar Coordinates (10.3, 10.4)
Friday, October 16   ⎬

    p. 694: 1-25 odd, 27, 37, 38, 51, 53, 55, 59
    p. 703: 1-12 all, 13, 15, 17, 27, 29, 31

Monday, October 19   ⎱   Review
Wednesday, October 21 ⎰

QUIZ 8 (MONDAY)

Test 2 on October 22 at 7:45 a.m.

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Friday, October 23   Infinite Sequences (8.1)

      p. 557: 1-53 odd, 55, 57, 65, 67

Monday, October 26   ⎱   Infinite Series (8.2)
Wednesday, October 28 ⎰

      p. 566: 1-27 odd, 41-51 odd

Friday, October 30   Integral Test and p-series (8.3)

      p. 573: 1-31 odd, 33, 34

Monday, November 2   Comparisons of Series (8.4)

      p. 579: 1-25 odd, 27-34 all
      handout
QUIZ 9 (MONDAY)

Wednesday, November 4   Alternating Series (8.5)

      p. 587: 1-35 odd

Friday, November 6   Ratio and Root Test (8.6)

      p. 594: 1-4 all, 5-24 odd, 25, 26, 35-51 odd
      handout

Monday, November 9   Review Infinite Series

QUIZ 10

Wednesday, November 11   Power Series (8.8)

p. 613: 1-35 odd, 37, 38

Friday, November 13   Power Series (8.9)

p. 620: 1-25 odd
COMPUTER PROJECT DUE

Monday, November 16   ⎫   Taylor and Maclaurin Series (8.10)
Wednesday, November 18 ⎭

p. 630: 1-8 all, 17-23 all
p. 631: 1-9 odd, 13-19 odd, 27-38 all, 41-46 odd
handout
QUIZ 11 (WEDNESDAY)

Friday, November 20 Review Power Series

Monday, November 23   Review
                          Review for final handout

Test 3 on November 24 at 7:45 a.m.

Wednesday, November 25 - Sunday, November 29 is Thanksgiving Break

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Monday, November 30   ⎫   Introduction to Differential Equations
Wednesday, December 2 ⎭

[Class Notes]
handout
QUIZ 12 (WEDNESDAY)

Friday, December 4   ⎫   Review
Monday, December 7   ⎭

Wednesday, December 9 is Reading Day