# PROPOSED SYLLABUS FOR MATH 75B MATHEMATICAL ANALYSIS WITH REVIEW 1B

### Spring 2006

Time and place: Web page: Units: 4 Prerequisite: Math 75A Instructor: Office and office hours: Phone: Email:

#### Textbooks:

Stewart, Calculus (Early Transcendentals), 5th Edition.
Ebersole et al., A Companion to Calculus.

### Catalog description

Prerequisite: Math 75A. Applications of differentiation, antidifferentiation, the definite integral, and applications, with extensive review of algebra and elementary functions. Use of computer software as an exploratory tool. With Math 75A, equivalent to Math 75.

### **Course objectives**

Upon completion of this course, students should understand:

- How to interpret the derivative in the context of real-world examples.
- The definition of antiderivative.
- The integral as an area or the distance traveled by a moving object.
- The idea of an "area function" under the graph of a function f, and how it relates to the function f itself.
- The two parts of the Fundamental Theorem of Calculus.
- The relationship between integrals and antiderivatives.

#### Learning outcomes

Upon completion of this course, students will be able to do:

- Compute certain simple antiderivatives.
- Find maximum or minimum values of functions.
- Solve "real-world" optimization problems by converting them into the language of calculus.
- Approximate zeros of a function using Newton's Method.
- Compute the definite integral of any polynomial or root function.
- Define the definite integral as a limit of Riemann sum approximations.
- Graph, differentiate, and integrate functions using the computer software chosen by the instructor.

#### Attendance

It is important to attend every class because every lecture is based on previous material. Attendance will be taken, and occasionally, a quiz will be given.

If you miss a class, you should contact one of your classmates or the instructor to find out what was done in class and whether important announcements were made or homework was assigned, and read the appropriate sections of the book.

# Homework

There will be weekly homework. No late papers will be accepted except for in case of an illness or a serious family emergency. Working with your classmates is allowed and encouraged, but every student must write his or her own papers. If you work with someone, please indicate that on your paper.

### Tests

There will be 3 hour tests and a comprehensive final exam. Make-up exams will be given only in case of an illness or a serious family emergency. No notes, books, or calculators will be allowed.

## Extra help

It is important not to fall behind. If you need extra help, you are encouraged to

- ask your instructor in class
- come to the instructor's office hours or make an appointment
- work with your classmates
- go to the Mathematics tutor lab in EE 167.

### Grading procedures

Your grade will be based on your performance on quizzes, tests, and homework according to the following tables.

Quizzes	30 points
Test 1	50 points
Test 2	50  points
Test 3	50 points
Homework	100 points
Final Exam	100 points
Effort, attendance, participation	20 points
Total	400 points

Points earned	Letter grade
360-400 (90%-100%)	А
320-359~(80%-89%)	В
280-319 (70%-79%)	С
240-279 (60%-69%)	D
0-239 (0%-59%)	$\mathbf{F}$

#### Topics to be covered

- 1. Applications of Differentiation. Related rates, linear approximations and differentials. Maximum and minimum values, the mean value theorem, how derivatives affect the shape of a graph, limits at infinity, horizontal asymptotes, summary of curve sketching, optimization problems, Newton's method, antiderivatives.
- 2. Integrals. Areas and distances, the definite integral, the fundamental theorem of calculus, indefinite integrals and the net change theorem, the substitution rule.
- 3. Applications of Integration. Areas, distance problem.

# Classroom behavior

Any disruptive behavior in class that interferes with the learning environment will not be tolerated. University policies on disruptive behavior are followed and enforced in every instance.

## Academic honesty

Cheating in this class will not be tolerated. University policies on plagiarism and cheating are followed and enforced in every instance.

## Students with disabilities

University student disability policies are followed. Contact the Disabled Student Services office (located in the Madden Library) for specific arrangements and information.

## Computers

At California State University, Fresno, computers and communications links to remote resources are recognized as being integral to the education and research experience. Every student is required to have his/her own computer or have other personal access to a workstation (including a modem and a printer) with all the recommended software. The minimum and recommended standards for the workstations and software, which may vary by academic major, are updated periodically and are available from Information Technology Services or the University Bookstore. In the curriculum and class assignments, students are presumed to have 24-hour access to a computer workstation and the necessary communication links to the University's information resources.

## Syllabus is subject to change

This syllabus and schedule below are subject to change in the event of extenuating circumstances. If you are absent from class, it is your responsibility to check on announcements made while you were absent.

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# Tentative schedule

Note: sections 1.1, 1.2, etc, are from Stewart, *Calculus (Early Transcendentals)* sections 2-A, 2-B, etc. are from Ebersole et al., *A Companion to Calculus*.

Week	Sections and topics
1	10-A. Iteration
	10-B. Rate of Change of Rate of Change
	3.7. Higher derivatives
	3.8. Derivatives of logarithmic functions
2	3.9. Hyperbolic functions
	11-A. Setting up equations for related rates problems
	3.10. Related rates
3	11-B. Problem-solving strategies for related rates problems
	12-A. Tangent line approximation
	12-B. The differential
	3.11. Linear approximations and differentials
4	15-C. Solving equations with logarithmic and exponential functions
	16-A. Solving equations to find critical values
	16-B. Setting up functions to solve extreme value problems
	4.1. Maximum and minimum values
5	4.2. The mean value theorem
_	3-C1. Inequalities
	Test 1
6	17-A. Solving inequalities
	17-B. Graphical interpretation
	17-C. Putting it all together
7	4.3. How derivatives affect the shape of a graph
	4.4. Indeterminate forms and L'Hospital's rule
	4.5. Summary of curve sketching
8	4.7. Optimization problems
	4.8. Applications to business and economics
	4.9. Newton's method
9	18-A. Antidifferentiation as the inverse of differentiation
	18-B. Recognizing antiderivatives
	4.10. Antiderivatives
10	19-A. Exact areas using basic geometric shapes
	19-B. Approximation of areas
	Test 2
11	19-C. Riemann sums and their interpretation
	5.1. Areas and distances
	20-A. Area under a curve as a definite integral
12	5.2. The definite integral
	3-C2. Absolute value: equations and inequalities
	20-B. Other interpretations of the definite integral
13	20-C. The fundamental theorem of calculus
	5.3. The fundamental theorem of calculus
	5.4. Indefinite integrals and the net change theorem
14	18-C. Substitution for antiderivatives
	20-D. Change of variable in definite integrals
	5.5. The substitution rule
15	Test 3
	Review