PROPOSED SYLLABUS FOR MATH 75A  
MATHEMATICAL ANALYSIS WITH REVIEW 1A

Fall 2005

Time and place:  
Web page:  
Units:  
Phone:  
Email:

Textbooks:  
2. Ebersole et al., *A Companion to Calculus*.

Catalog description

Prerequisite: Elementary geometry, intermediate algebra, trigonometry, ELM requirement.  
Inequalities, functions, graphs, limits, continuity, derivatives, and applications, with extensive  
review of algebra and elementary functions. Use of computer software as an exploratory tool. 

Course objectives

Upon completion of this course, students should understand:

- The benefits and limitations of mathematical models.
- The concept of a limit.
- Continuous functions.
- The definition of a derivative as a limit of difference quotients.
- How to interpret the derivative in the context of real-world examples.

Learning outcomes

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

- Use functions to represent changing quantities.
- Compute limits of algebraic expressions.
- Compute the derivative of any polynomial, rational function, trigonometric function, root function, exponential function, or any combination of such functions.
- Identify the ways in which a function can fail to have a derivative.

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.

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
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</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>30 points</td>
</tr>
<tr>
<td>Test 1</td>
<td>50 points</td>
</tr>
<tr>
<td>Test 2</td>
<td>50 points</td>
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<tr>
<td>Test 3</td>
<td>50 points</td>
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<tr>
<td>Homework</td>
<td>100 points</td>
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<tr>
<td>Final Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Effort, attendance, participation</td>
<td>20 points</td>
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<tr>
<td>Total</td>
<td>400 points</td>
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</table>

<table>
<thead>
<tr>
<th>Points earned</th>
<th>Letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>360-400 (90%-100%)</td>
<td>A</td>
</tr>
<tr>
<td>320-359 (80%-89%)</td>
<td>B</td>
</tr>
<tr>
<td>280-319 (70%-79%)</td>
<td>C</td>
</tr>
<tr>
<td>240-279 (60%-69%)</td>
<td>D</td>
</tr>
<tr>
<td>0-239 (0%-59%)</td>
<td>F</td>
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</tbody>
</table>

Topics to be covered

1. **Function and Models.** Four ways to represent a function, Mathematical models, a catalog of essential functions, new functions from old functions.

2. **Limits and Derivatives.** The tangent and velocity problems, the limit of a function, calculating limits using the limit laws, continuity, tangents, velocities, and other rates of change.

3. **Derivatives.** The derivative as a function, differentiation formulas, rates of change in the natural and social sciences and engineering, derivatives of trigonometric functions, the chain rule, implicit differentiation.

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

Anyone with a disability should inform the University and the instructor of such so that reasonable accommodations can be made for learning and evaluation. The office of Services for Students with Disabilities is located in room 1049 of the Madden Library or you may call 278-2911.

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.

<table>
<thead>
<tr>
<th>Week</th>
<th>Sections and topics</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2-A. Function notation</td>
</tr>
<tr>
<td></td>
<td>2-B. Domain and range of a function</td>
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<tr>
<td></td>
<td>2-C. Different ways to represent a function</td>
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<tr>
<td></td>
<td>1.1. Four ways to represent a function</td>
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<td></td>
<td>2-D. The graph of a function</td>
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<tr>
<td>Week</td>
<td>Sections and topics</td>
</tr>
<tr>
<td>------</td>
<td>---------------------</td>
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</tbody>
</table>
| 2    | 2-E. Special classes of functions  
|      | 1.2. Mathematical models: a catalog of essential functions  
|      | 2-F. Transformations of graphs  
|      | 3-A1. Algebraic combinations of functions  
|      | 1.3. New functions from old functions |
| 3    | 3-B. Algebraic simplification of functions  
|      | 13-A. Rules of exponents  
|      | 13-B. The natural exponential function  
|      | 1.5. Exponential functions |
| 4    | 14-A. One-to-one functions  
|      | 14-B. Inverse of a function  
|      | 1.6. Inverse functions and logarithms  
|      | 14-C. Finding the inverse |
| 5    | 15-A. Definition and properties of logarithmic functions  
|      | 15-B. Graphs of logarithmic functions  
|      | 2.1. Tangent and velocity problems  
|      | Test 1 |
| 6    | 2.2. The limit of a function  
|      | 5-A2. Vertical asymptotes  
|      | 5-B2. Finding vertical asymptotes  
|      | 2.3. Calculating limits using the limit laws |
| 7    | 4-A. Polynomials  
|      | 4-B. Zeros of a polynomial function  
|      | 4-C. Domains of functions  
|      | 2.5. Continuity |
| 8    | 6-A. Rates of change: problem solving  
|      | 6-B. Applications  
|      | 6-C. Secant and tangent lines  
|      | 5-A1. Horizontal asymptotes |
| 9    | 5-B1. Finding horizontal asymptotes  
|      | 2.6. Limits at infinity; horizontal asymptotes  
|      | 2.7. Tangents, velocities, and other rates of change  
|      | 2.8. Derivatives |
| 10   | 2.9. The derivative as a function  
|      | 7-A. Negative and rational exponents  
|      | Test 2 |
| 11   | 7-B. Decomposition of functions  
|      | 3.1. Derivatives of polynomials and exponential functions  
|      | 3.2. The product and quotient rules  
|      | 3.3. Rates of change in natural and social sciences |
| 12   | 7-C. Simplifying derivatives  
|      | 8-A. Angle measures  
|      | 8-B. Definition and evaluation of the trigonometric functions  
|      | 8-C. Properties of the trigonometric functions |
| 13   | 8-D. Domain, range, and graphs of the trigonometric functions  
|      | 3.4. Derivatives of trigonometric functions  
|      | 8-E. Combining functions with the trigonometric functions  
|      | 3-A2 Composition of functions |
| 14   | 3.5. The chain rule  
|      | 9-A. Implicitly defined functions  
|      | 9-B. Solving equations that contain dy/dx  
|      | 3.6. Implicit differentiation |
| 15   | Test 3  
|      | Review |