



# General Education Course Proposal

Proposed Course: MATH 75A Mathematical Analysis with Review IA Units 4  
Prefix No. Title

Department: Mathematics College/School: CSM

**GE Category (Indicate one category only):**

Foundation: A1 \_\_\_ A2 \_\_\_ A3 \_\_\_ B4   
Breadth: B1 \_\_\_ B2 \_\_\_ C1 \_\_\_ C2 \_\_\_ D \_\_\_ E \_\_\_  
Integration: B \_\_\_ C \_\_\_ D \_\_\_ International/Multicultural \_\_\_

Existing Course \_\_\_ Revised Course \_\_\_ **New Course**   
Course Included in Current GE Program  Part of a sequence equivalent to an existing GE course.

New courses require the Undergraduate Course Proposal form in addition to this form.  
Revised courses require the Undergraduate Course Change Request in addition to this form.

**Proposed catalog description:** Limit course description to 40 words using succinct phrases. Include prerequisites, limitations, lecture/lab hours. Indicate former course number, e.g., (Former Biol 105)

Prerequisite: Elementary geometry, intermediate algebra, trigonometry, ELM requirement. Enrollment by invitation only. Inequalities, functions, graphs, limits, continuity, derivatives, and applications, with extensive review of algebra. Use of Mathematica as an exploratory tool. G.E. Foundation B4. With Math 75B, equivalent to Math 75.

Enrollment limit per section: 30  
Expected number of sections per semester - Year 1 2 Year 3 4

**Attachments:**

1. A statement presenting the ways in which this course meets the Specifications provided in the appropriate section of the General Education Policy as well as in the Policies for Inclusion and Evaluation of General Education Courses.
2. A statement of elements common to all sections of this course, identifying content, objectives, required student activities, grading policy, representative texts, and an approximate schedule for the course. Required student activities include such things as papers, research projects, homework, laboratory and/or studio performance, recitations, participation, attendance, and exams.
3. A typical syllabus for a particular offering of the course.
4. Any special cost factors associated with this course.

**Approval for Inclusion in General Education**

Lay W. [Signature] 3/24/04  
Department Chair Date

**Original Signed by Kin-Ping Wong**  
\_\_\_\_\_  
College/School Dean Date

[Signature] 5/07  
Associate Provost Date

*Original Signed by Committee Chair*  
\_\_\_\_\_  
College/School Curriculum Committee Date

[Signature] 5/07  
General Education Subcommittee Date

**Forward Original and TWELVE copies to:  
Associate Provost for Academic Affairs, M/S TA 54**

## GENERAL EDUCATION COURSE PROPOSAL

## ATTACHMENTS

Course: Math 75A, Mathematical Analysis with Review I

Quantitative Reasoning (B4)

**1. Specifications:**

- (a) Math 75A is the first semester of the sequence Math 75A, Math 75B, which is a blend of Math 6 (precalculus) and Math 75 (first semester calculus). The sequence is designed to give students extra support from precalculus. Students learn to apply the mathematical language and techniques of the calculus to many problems from many different disciplines. These include problems from physics (projectile and planetary motion), biology (population dynamics), mathematics (geometry), chemistry and geology (carbon dating).
- (b) In the precalculus and calculus, the student learns to develop arguments based upon logic, numerical calculations, symbolic and geometric reasoning.
- (c) Student success in the precalculus and calculus is more a function of the student's conceptual understanding of the language, techniques and problem solving strategies learned, rather than mere computational skill.
- (d) The calculus is rich in history. The techniques learned solve several problems of historical importance (projectile and planetary motion for example.) Instructors incorporate into their lectures the historical context of many of the ideas and techniques from the calculus.

**2. Common elements to all sections:**

- (a) The common content to all sections of Math 75A includes:
  - i. graphs of elementary functions
  - ii. inequalities
  - iii. techniques of analytic geometry
  - iv. functions and limits
  - v. rates of change and the derivative, with applications
- (b) The Department of Mathematics uses common textbooks for Math 75A. Currently the texts are *Calculus 5/E* by Stewart and *A Companion to Calculus* by Ebersole et al.
- (c) Regularly assign homework from the texts.

**3. Typical syllabus attached.****4. Cost Factor:**

None. (There will be fewer sections of Math 75.)

# MATH 75A MATHEMATICAL ANALYSIS WITH REVIEW IA

## Majors affected by the proposed course MATH 75A

The following programs currently require MATH 75 for the major or minor:

- Civil and Geomatic Engineering and Construction
- Computer Science
- Electrical and Computer Engineering
- Mechanical and Industrial Engineering
- Biology
- Chemistry
- Earth and Environmental Sciences
- Mathematics
- Physics

We propose that students in these programs be allowed to satisfy the MATH 75 requirement by taking both MATH 75A and MATH 75B, which together are equivalent to MATH 75.

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

Fall 2005

**Time and place:**

**Web page:**

**Units:** 4

**Enrollment by invitation only.**

**Instructor:**

**Office and office hours:**

**Phone:**

**Email:**

**Textbooks:**

1. Stewart, *Calculus*, 5th Edition.

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

**Catalog description:** Prerequisite: elementary geometry, intermediate algebra, trigonometry, ELM requirement. Enrollment by invitation only. Inequalities, functions, graphs, limits, continuity, derivatives, and applications, with extensive review of algebra. Use of *Mathematica* as an exploratory tool. G.E. Foundation B4. With Math 75B, equivalent to Math 75.

## 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.

and should be able to:

- Use functions to represent changing quantities.
- Compute limits of algebraic expressions.
- Compute the derivative of any polynomial, rational function, trigonometric function, root 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 midterm exams 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
Attendance	20 points
Total	400 points

Points earned	Letter grade
360-400 (90%-100%)	A
320-359 (80%-89%)	B
280-319 (70%-79%)	C
240-279 (60%-69%)	D
0-239 (0%-59%)	F

## Topics to be covered

1. **Algebra Review.** Rules of exponents, factoring, algebraic simplification, solving equations and inequalities.
2. **Elementary Functions Review.** Graphs, domain and range of a function, transformations of graphs, combinations of functions, trigonometry.
3. **Functions and Models.** Four ways to represent a function, mathematical models, a catalog of essential functions, new functions from old functions.
4. **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.
5. **Derivatives.** The derivative as a function, differentiation formulas, rates of change in the natural and social sciences, derivatives of trigonometric functions, the chain rule, implicit differentiation, higher derivatives, related rates.

## 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.