SM332H **Real Analysis** **Spring 2005**

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- **Office:** Preble 233 **Office Hours:** By appointment

- **Textbook:** The Elements of Real Analysis, second edition, by Robert G. Bartle
- **Course Description:** Evidently 332H is a continuation of 331H. We will cover differentiability of real valued functions of one real variable, the mean value theorem and its applications, Taylor's theorem; the Riemann-Stieltjes integral and applications; numerical series, convergence tests; an introduction to function spaces, sequences and series of functions, uniform convergence, the Stone-Weierstrass theorem, Taylor and Fourier series; derivative and integral of functions of several variables. All this is contained in chapters V-VIII of the book. A more detailed syllabus is given on the other side of this page.

  A solid understanding of the material covered in 331H, especially the theory of continuous functions, is absolutely necessary. There will be weekly homework assignments assigned on Fridays and due a week thereafter. Class participation is very much encouraged and will be often required in the form of class presentations. A capstone project with a class presentation at the end of the semester is also required.

- **Exams and Grades:** There will be two hourly exams and a final exam. The final grade will be based on the following:

  Homework 30%, Midterms 20%, Capstone project 20%, Final 30%

SM332H **Syllabus** **Spring 2005**

1.Differentiability of real functions of one real variable. The mean value theorem and applications. Taylor polynomials and Taylor's theorem (sections 27-28).

2. The Riemann-Stieltjes integral, existence and properties, improper integrals, applications (sections 29-32).

3. Numerical series, absolute and conditional convergence, rearrangements, convergence tests (sections 34-36).

4. Sequences and series of functions, uniform convergence. Uniform convergence and preservation of continuity, differentiability and integrability. Function spaces (sections 17, 24, 33, 37).

5. Stone-Weierstrass theorem, Taylor series, Fourier series, pointwise, uniform and L^2 convergence, Fejer's theorem (sections 24, 26, 38).

6. Introduction to functions of several variables. Differentiation, the chain rule, implicit and inverse function theorems, the Riemann integral (sections 39-45)