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PM

# MA411 ADVANCED CALCULUS I

Fall 2000

MWF 1:00 - 1:50 E115

**INSTRUCTOR: DR. CHOCK WONG**

**Office:** Henry Hall 018 (Phone: 739-4682)

**Office Hours:** M 11:00-11:55am, W 12:00-12:50pm, MTWRF 2:00-3:00pm.

**Course Description:** This is one of the math major requirements. By taking this course, students will learn the theoretical structure of mathematical analysis (calculus of one variable functions). Proofs of theorems and intensive writing (in mathematics) will be stressed.

**Prerequisites:** MA311 (Calculus III), or consent of instructor with MA211.

**Text Book:** Real Analysis, A First Course. By Russell A. Gordon.  
*Addison - Wesley Higher Mathematics*. ISBN 0-201-83210-0.

**Topics To Cover:** Chapter 1 to Chapter 9 of the text will be taught, and the main topics are:

- (1) The real number system: The Completeness Axiom, uncountability of the real number system. (Ch.1)
- (2) Sequences: Convergence, Cauchy sequences, Bolzano-Weierstrass Theorem. (Ch.2)
- (3) Limits: Algebra of limits, one-sided limits and infinite limits. (Ch.3)
- (4) Continuity: Continuous functions and uniform continuity, Intermediate & Extreme Value Theorems, monotone functions, inverse functions. (Ch.4)
- (5) Differentiation: The Mean-value Theorem, L'Hospital Rule. (Ch.5)
- (6) Integration: The Riemann integral, the Fundamental Theorem of Calculus, integral of discontinuous functions. (Ch.6)
- (7) Infinite series: Convergence of series, convergence tests. (Ch.7)
- (8) Sequences and series of functions: Uniform convergence, power series and Taylor series. (Ch.8)
- (9) Point-set topology: Open and closed sets, limit points, compact sets, Heine-Borel Theorem, continuous functions and compact sets. (Ch.9)

**Homework:** For each chapter being covered, most of the problems will be assigned either as self-exercise or to turn in for grading. Some problems will be chosen as in-class exercises or presentations.

**Evaluation:** Based on homework assignments, class presentations, quizzes, and (take home) examinations.