Hg

SYLLABUS

MA411 ADVANCED CALCULUS I

Spring 1999

TTh 11:00 – 12:20 HH227

INSTRUCTOR: DR. CHOCK WONG

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

Office Hours: MF 11:00–12:00, TH 2:00-3:00.

Course Description: This is one of the math major requirements. By taking this course, students will learn the theoretical structure of mathematcal 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 0-471-02195-4.

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 $\mathcal{R}$. (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, tests for convergence. (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.

Homework: For each chapter covered, most of the problems will be assigned either as self-exercises or to turn in for grading. Some problems may be chosen as oral presentation assignments.

Evaluation: Basd on homework assignments, class presentations, quizzes, and take home examinations.