

ADVANCED CALCULUS I

(“ Math 252 ”)

INSTRUCTORS : Sadettin Erdem, Cem Tezer

SUMMARY OF CONTENTS :

Real Numbers : Ordered fields, Archimedean property, completeness.

Basic Topology of \mathbb{R}^n : Bolzano-Weierstrass Theorem, Heine-Borel Theorem, Lebesgue Covering Lemma.

Convergence : Sequences in \mathbb{R}^n . Cauchy Criterion. Sequences of functions, uniform convergence.

Continuity : Intermediate Value Theorem. Uniform continuity.

Sequences of continuous functions : Stone-Weierstrass Theorem.

Differentiation on \mathbb{R} : Rolle’s Lemma, Mean Value Theorem.

Differentiation on $\mathbb{R}^n, n > 1$: Partial derivatives. Total derivative as a linear map. Inverse Function Theorem, Implicit Function Theorem.

PRINCIPAL TEXTBOOK : R. G. Bartle : “ The Elements of Real Analysis ”

ASSESSMENT : There will be two midterm ($MT1, MT2$) and one final (F) examinations with 100 points and five ($Q1, Q2, Q3, Q4, Q5$) ‘quiz’ type small examinations with 4 points to be awarded in each. The number grade NG of the student will be obtained by

$$NG = 0.25(MT1 + MT2) + 0.5(Q1 + Q2 + Q3 + Q4 + Q5) + 0.4F$$

“ MAKE-UP ” : There will be only one ‘make-up’ examination for the benefit of those students who, hopefully for good reasons, have been unable to sit for any of the midterm or final examinations. The ‘make-up’ will resemble the final examination as regards its form and content and take place shortly after it. The grade obtained in the ‘make-up’ examination will be treated as the grade obtained in the unattended examination.