

Math 545-001 : Advanced Calculus I Course Outline - Fall 2003

Text: W. Folland, Advanced Calculus, Prentice-Hall (ISBN 0-13-065265-2)

Topics	Sections
Week 1 Review of calculus. Euclidean spaces. Limits and continuity.	1.1-1.3
Week 2 Sequences, completeness and compactness.	1.4-1.6
Week 3 Connectedness and uniform continuity.	1.7, 1.8
Week 4 Differentiability in one variable. Exam 1.	2.1
Week 5 Differentiability in \mathbb{R}^n , chain rule and mean value theorem.	2.2-2.4
Week 6 Implicit functions, Taylor's theorem and critical points.	2.5-2.7
Week 7 Variational problems and vector-valued functions. The implicit function theorem.	2.9, 2.10, 3.1
Week 8 Parametric curves, surfaces and coordinate transformations. Functional dependence.	3.2-3.5
Week 9 Riemann integration in \mathbb{R} . Exam 2.	4.1
Week 10 Integration in \mathbb{R}^n . Iterated integrals.	4.2, 4.3
Week 11 Integration theory continued. Change of variables formula.	4.4, 4.5
Week 12 Improper integrals.	4.6, 4.7
Week 13 A hint of Lebesgue integration. Arc length and line integrals.	4.8, 5.1
Week 14 Green's theorem. Review.	5.2

Final Examination

(prepared by D. Blackmore - 8/20/03)