Department of Mathematics & Statistics
Concordia University

MATH 467 (MATH 601L)
Measure Theory
Winter 2006

Instructor:	Dr. G. Dafni, Office: LB 927-15 (SGW), Phone: 848-2424, Ext. 3216 Email: gdafni@mathstat.concordia.ca
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Required Textbook:	*Real Analysis*, 3rd Edition, by H.L. Royden, Macmillan, 1988. Additional References (on reserve in the Webster Library): *Measure Theory,* by P.R. Halmos, Springer-Verlag, 1974; *Principles of Mathematical Analysis,* 3rd Edition, by W. Rudin, MacGraw-Hill, 1976; *Real and Complex Analysis*, 3rd Edition, by W. Rudin, MacGraw-Hill, 1987.
Homework:	Homework will be assigned approximately once every two weeks, during lecture. In the case of an absence, it is the student's responsibility to find out the homework assignment and turn in the homework on time. **Late homework will not be accepted.**
Mid-term exam:	There will be an in-class exam during the 8th or 9th week of classes (after the midterm break). The exact date of the exam will be announced in class at least a week in advance.
Final Exam:	To be announced.
Grade:	a) Homework assignments 20%, Midterm exam 25%, Final exam 55% or b) Final exam 100%
Graduate Students:	There will be additional requirements for graduate students, to be announced.

Outline:

- Historical background
- Review: sets, real numbers, metric spaces & Riemann integration (Royden Chs. 1, 2, 7; Rudin, Principles, Chs. 1-7)
- Lebesgue measure: outer measure, measurable sets, measurable functions (Royden Ch. 3; Rudin, Principles, Ch. 11)
- Lebesgue integration: simple functions, bounded functions, nonnegative functions, complex functions (Royden Ch. 4; Rudin, Principles, Ch. 11; Rudin, Real & Complex, Ch. 1)
- Convergence: Monotone Convergence Theorem, Fatou's Lemma, Dominated Convergence Theorem, convergence in measure (Royden Ch. 4; Rudin, Principles, Ch. 11; Rudin, Real & Complex, Ch. 1)
- Differentiation and integration: functions of bounded variation, absolute continuity, Fundamental Theorem of Calculus, difference with Riemann integration (Royden Ch. 5; Rudin, Principles, Ch. 11; Rudin, Real & Complex, Ch. 7)
- L^p spaces: Hölder inequality, completeness, L^2, Fourier series (Royden Ch. 6; Rudin, Principles, Ch. 8, 11; Rudin, Real & Complex, Chs. 3, 4)
- (as far as time permits) Abstract measure theory: measure and integration, probability spaces, product measures, L^p spaces, Banach spaces (Royden Chs. 11 - 12; Rudin, Real & Complex, Chs. 1 - 8)