Math 4151 (Winter 2019) Advanced Calculus

INSTRUCTOR: Huang, W. Ph.D. (RB 2007, Ext: 8798, Email: whuang1@lakeheadu.ca)

COURSE DESCRIPTION:

Topology of R^n. Continuity and differentiability of functions from R^n to R^m. Taylor's Theorem for functions of n variables. Maxima and minima; positive definite and negative definite quadratic forms. The Inverse Function Theorem and the Implicit Function Theorem. Fubini's Theorem. Change of variables in multiple integrals.

TEXT: Lecture notes by Volker Runde, 2006 (Chapters 1-6)

LECTURES: MW, 1:00 - 2:30 PM. (RB 2026).

OFFICE HOUR: By appointments.

MARKING SYSTEM:

Assignments: 20%, In-Class Presentation: 30%, Final Exam: 50%.

TENTATIVE SCHEDULE (SUBJECT TO CHANGES):

Date	Sections	Date	Sections
Week 1		**Week 7**	Study Break
Mon. Jan. 7	1.1: Real line	Mon. Feb. 25	4.3: Evaluation of integrals in one variable
Wed. Jan. 9	1.2: Functions	Wed. Feb. 27	4.4: Fubini's Theorem 4.5: Integration in Polar, spherical, and cylindrical coordinates
Week 2		**Week 8**	
Mon. Jan. 14	1.3: Euclidean space R^n	Mon. Mar. 4	5.1: Local properties of C1-functions
Wed. Jan. 16	1.4: Topology	Wed. Mar. 6	5.2: The implicit function theorem
Week 3		**Week 9**	
Mon. Jan. 21	2.1: Limits of Sequences 2.2: Limits of functions	Mon. Mar. 11	5.3: Local extrema with constraints
Wed. Jan. 23	2.3: Global properties of continuous functions 2.4: Uniform continuity	Wed. Mar. 13	6.1: Change of variables,
Week 4		**Week 10**	
Mon. Jan. 28	3.1: Differentiation in one variable	Mon. Mar. 18	6.2: Curves in R^n
Wed. Jan. 30	3.2: Partial derivatives	Wed. Mar. 20	6.3: Curve integrals
Week 5		**Week 11**	
Mon. Feb. 4	3.3: Vector fields 3.4: Total differentiability	Mon. Mar. 25	6.4: Green's theorem
Wed. Feb. 6	3.5: Taylor's Theorem 3.6: Classification of stationary points	Wed. Mar. 27	6.5: Surfaces in R^3
Week 6		**Week 12**	
Mon. Feb. 11	**Midterm**	Mon. April 1	6.6: Surface integrals and Stokes' Theorem
Wed. Feb. 13	4.1: Content in R^n 4.2: Riemann integral in R^n	Wed. April 3	6.7: Gauss' theorem