

Course Guide Advanced Calculus: Fall 2017:

Date	Topic	Text	Assignment
M: 8-28	limits and topology in normed spaces		
F: 9-1	the Frechet derivative and linearization		
M: 9-4	partial differentiation and directional derivatives, continuous differentiability Theorem		
F: 9-8	one chain rule to rule them all and product rules galore		
M: 9-11	intuitive proofs of the inverse and implicit function thm. & implicit differentiation		
F: 9-15	On spaces and tangent spaces in R^n , application to Lagrange multipliers		
M: 9-18	on multivariate power series & local extrema		
F: 9-22	Introduction to variational calculus and energy methods in mechanics		
M: 9-25	tangent space and "geometric sets"	3.1- 3.5	
F: 9-29	tangent space and "geometric sets"	3.1- 3.5	
M: 10-2	tangent space and "geometric sets"	3.1- 3.5	
	Fall Break : no class 10-5 & 10-6		
M: 10-9	Test 1		
F: 10-13	tangent space and "geometric sets"	3.1- 3.5	
M:10-16	diffeomorphism and vector fields	3.6 – 3.7	
F:10-20	flows and vector fields	3.8 – 3.9	
M:10-23	exterior algebra on a vector space	4.1 – 4.2	
F:10-27	differential forms and their calculus	4.3 – 4.4	
M:10-30	integrals of differential forms, Poincare Lemma, generalized Stokes' theorem	4.5	
F:11-3	tensors and Lie derivatives	4.6 – 4.7	
M: 11-6	Riemannian geometry, from the basics to the concept of a connection	5.1 – 5.7	
F: 11-10	Riemannian geometry, parallelism, geodesics	5.1 – 5.7	
M: 11-13	Riemannian geometry, curvature	5.1 – 5.7	
F:11-17	Riemannian geometry, isometry and Gauss' Awesome Theorem	5.1 – 5.7	
	Thanksgiving Break: no class 11-21 to 11-25.		
M:11-27	Test 2		
F: 12-1	Contact geometry, motivation and basics	6.1 – 6.7	
M:12-4	Contact geometry, contact diffeomorphisms and vector fields, Darboux's Thm.	6.1 – 6.7	
F: 12-8	Contact geometry, contact diffeomorphisms and vector fields, Darboux's Thm.	6.1 – 6.7	
M: 12-11	Contact geometry, contact diffeomorphisms and vector fields, Darboux's Thm.	6.1 – 6.7	
	Final Exam		

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Grading: usual 1000pt scale with:

Test 1 = 200pts,

Test 2 = 200pts,

Homework = 280pts,

Class Participation = 20pts,

Final = 300pts.