3593H (Honors Mathematics II) Syllabus, Part I – Spring 2016

Rough Outline: We hope to finish Chapters 4-6 of Hubbard and Hubbard's book, which cover integral calculus in several variables. We will following their outline closely. The reading to complete in advance of class is listed in parentheses.

This syllabus covers the first chapter up to our first in-class midterm. As usual, it is likely to change once the class is under way and we have a better idea about pacing. The readings listed will still be correct for the given topic.

I. Riemann and Lebesgue Integration

1.	W	Jan. 20	Outline of course, Riemann sums (Section 4.1, up to p. 403)
2.	F	Jan. 22	Volumes, Introduction to probability (Section 4.2 up to p. 413)
3.	M	Jan. 25	Variance, Standard deviation, Central limit theorem (p. 413 to end of Sect. 4.2)
4.	W	Jan. 27	Integrable functions (Section 4.3)
5.	F	Jan. 29	Sets of measure zero (Section 4.4)
6.	M	Feb. 1	Iterated integrals and Fubini's theorem (Section 4.5, up to p. 444)
7.	W	Feb. 3	Applications of Fubini's theorem (p. 444 to end of Sect. 4.5)
8.	F	Feb. 5	Numerical integration (Section 4.6, up to p. 456)
9.	M	Feb. 8	Monte Carlo methods, Other pavings (p. 456 to end of Sect. 4.7)
10.	W	Feb. 10	Determinants, part I (Section 4.8 to p. 467)
11.	F	Feb. 12	Determinants, part II (p. 467 to the end of Sect. 4.8)
12.	M	Feb. 15	Volumes and determinants (Section 4.9)
13.	W	Feb. 17	Classical changes of variables (Section 4.10 to p. 490)
14.	F	Feb. 19	General changes of variables (p. 490 to the end of Sect. 4.10)
15.	M	Feb. 22	Review for Exam I
	W	Feb. 24	IN CLASS MIDTERM I
16.	F	Feb. 26	Lebesgue measure and integration (Section 4.11 to p. 503)
17.	M	Feb. 29	Lebesgue integral examples and major theorems (pp. 503–510)
18.	W	Mar. 2	Applications of Lebesgue integration (p. 510 to the end of Sect. 4.11)

II. Volumes on Manifolds

19.	F	Mar. 4	Volumes of k-parallelograms in $\mathbb{R}^n$ (Section 5.1)
20.	M	Mar. 7	Parametrizations of manifolds (Section 5.2 up to p. 527)
21.	W	Mar. 9	Examples and change of parametrization (p. 527 to end of Sect. 5.2)
22.	F	Mar. 11	Volumes of manifolds (Section 5.3)
		Mar. 14-18	SPRING BREAK - NO CLASSES
23.	M	Mar. 21	Curvature (Section 3.8 up to p. 379)
24.	W	Mar 23.	Computing curvature and parametrized curves (p. 379 to end of Sect. 3.8)
25.	F	Mar. 25	Integration and curvature (Section 5.4)
26.	M	Mar. 28	Review for Exam II
27.	W	Mar. 30	IN CLASS MIDTERM II (on Lebesgue integration and volumes of manifolds)

III. Differential Forms and Stokes' Theorem

28.	F	Apr. 1	Differential forms (Section 6.1 up to p. 563)
29.	M	Apr. 4	Wedge products (p. 563 to end of Section 6.1)
30.	W	Apr. 6	Integrating form fields (Section 6.2)
31.	F	Apr. 8	Orientation on Manifolds (Section 6.3)
32.	M	Apr. 11	Orientation-preserving maps (Section 6.4 up to p. 590)
33.	W	Apr. 13	Integrating on oriented manifolds (p. 590 to end of Sect. 6.4)
34.	F	Apr. 15	Forms and vector calculus (Section 6.5)
35.	M	Apr. 18	Orientation on the boundary (Section 6.6 to p. 611)
36.	W	Apr. 20	Pieces-with-boundary (p. 611 to the end of Sect. 6.6)
37.	F	Apr. 22	The exterior derivative (Section 6.7)
38.	M	Apr. 25	Div, grad, and curl (Section 6.8)
39.	W	Apr. 27	Generalized Stokes' theorem (Section 6.9 to p. 639)
40.	F	Apr. 29	Proof of Stokes' theorem (p. 639 to end of Sect. 6.9)
41.	M	May 2	Green's theorem Part I (Section 6.10)
42.	W	May 4	Green's theorem Part II (Section 6.10)
43.	F	May 6	Review for Final Exam
	M	May 9	FINAL EXAM 1:30 – 4:30 p.m. (Location TBA)