SYLLABUS FOR **MATH 2500**

Text: Hass, Weir, and Thomas,

University Calculus, Early Transcendentals, 2e

Summer 2012

Section	Topics and Recommended Exercises	# Days
	Chapter 11: Vectors and the Geometry of Space	
	Review dot product, cross product, lines and planes; while discussing parametric equations of a line, include a treatment of the parametric equations of a cycloid based on vector addition (cf. p. 567, but note angle t is directed incorrectly)	3
	§11.2: #**1**, **7**; §11.3: #**1**, **2**, **6**; §11.4: #**2**, **4**; §11.5: #**1**, **3**, **5**, **8**	
	Chapter 12: Vector-Valued Functions and Motion in Space	
12.1	Vector Functions and Their Derivatives (Use the cross-product rule to derive Kepler's Second Law: In a central force field, $\mathbf{r}(t) \times \mathbf{v}(t)$ is constant; so the trajectory is planar and sweeps out area at a constant rate.)	2
	§12.1: #1, 4, **7**, **9**, **11**, 21, **23**	
12.2–12.3	Integrals of Vector Functions, Arc Length in Space	1
	§12.2: #**1**, 7, **11**, **13**, 19, **23**, 24, **28**; §13.3: #**1**, **5**, **7**, **12**, **19**	
	Additional and Advanced Exercises: #1, 2	
	Chapter 13: Partial Derivatives	
13.1–13.2	Functions of Several Variables, Limits and Continuity in Higher Dimensions (Emphasize graphs versus level sets, soft-pedal subtle limit notions)	1.5
	§13.1: #3, 5, 7, 9, 13–18, 21, 22, 27, 33, 35, 37, 38	
13.3	Partial Derivatives	1.5
	§13.3: #**5**, **7**, **12**, **16**, **25**, **26**, **43**, 51, **55**, 57, 59, 60, **65**, 66, **67–68**, 69, **75–76**, **81**	
13.4	The Chain Rule	2
	§13.4: #**1**, **2**, 3, 7, 9, 11, 27, 29, 39, 40, 42, 47, **49**, 50, **51–52**	
13.5	Directional Derivatives and Gradient Vectors	1
	§13.5: #**1**, 3, 5, **7**, **8**, **11**, 14, **16**, 17, **19**, **22**, 25, **28**, 31, **35**, **36**	
13.6	Tangent Planes and Differentials	2
	§13.6: #**1**, **5**, **8**, **12**, **21**, **23**, **24**, **35**, **37**, **41**, **47**, 49, **51**	
13.7	Extreme Values and Saddle Points	2
	§13.7: #**1**, **3**, **8**, **13**, **15**, **16**, 19, 23, **35**, **39**, **49**	
13.8	Lagrange Multipliers (Do one constraint only.)	2
	§13.8: #**1**, **5**, **7**, **9**, **10**, 11, **17**, **25**, **27**, **30**, **43**, **44**	

Additional and Advanced Exercises: #3, 8, 13, 19

Chapter 14: Multiple Integrals

14.1–14.2	Double and Iterated Integrals over Rectangles; Double Integrals over General Regions §14.1: #**1**, **5**, **7**, **15**, **19**, **23**, **25**; §14.2: #1, 3, 7, 11, 12, 13, 17, **19**, **25**, **29**, **30**, **31**, **35**, **37**, **50**, **53**, **57**, **60**, [**78**, **79**]	3
14.3	Area by Double Integration §14.3: #**3**, 9, 11, **13**, **15**, **17**, **20**, **22**	1
14.4	Double Integrals in Polar Form (Include §10.3, as students will not have seen it.) §14.4: #3, 7, **10**, **13**, **17**, 23, 25, **28**, 32, **33**, **35**, **36**, **41**, **42**	2
14.5	Triple Integrals in Rectangular Coordinates §14.5: #**9**, **14**, **21**, **25**, **29**, **30**, [**47**]	1
14.6	Moments and Centers of Mass §14.6: #**4**, **13**, **21**, **25**, [**35–37**]	1
14.7	Triple Integrals in Cylindrical and Spherical Coordinates §14.7: #**1**, **11**, **12**, 15, **19**, **25**, **37**, **43**, **47**, **53**, **62**, **65**, **74**	2

Additional and Advanced Exercises: #2, 7, 11, 15, 26

Chapter 15: Integration in Vector Fields

15.1–15.2	Line Integrals; Vector Fields, Work, Circulation, and Flux §15.1: #**1–8**, **11**, 23, **33**; §15.2: #**1**, **5–6**, **7**, **12**, **15**, 23, 25, 27, **29**, **31**, **33**, **53**	2
15.3	Path Independence, Potential Functions, and Conservative Fields §15.3: #**1–6**, **8**, **9**, **11**, **14**, **19***, **22**, **25**, **30**, [**38**]	2
15.4	Green's Theorem in the Plane §15.4: #3, **4**, **5**, **7**, **11**, **15**, **18**, **21**, **22**, **23**, **26**, 35, 37, [38]	2
15.5	Surfaces and Area §15.5: #[1], 5, 7, 11, 13, **17**, **19**, **26**, **42**, **43**, [56]	2
15.6	Surface Integrals §15.6: #**2**, **3**, **5**, 8, **19**, **21**, **22**, **24**, 32, **34**, **36**, **41**, **43**	2
15.7	Stokes' Theorem §15.7: #**2**, **3**, **5**, **7**, **9**, **10**, 11, **14**, **15** [but book's instructions are stupid here] 21, [23], 26	2
15.8	The Divergence Theorem and a Unified Theory §15.8: #1, 2, **5**, **6**, **7**, **8**, **12**, **13**, 17, [21], 22, [27, 29, 30]	2

Additional and Advanced Exercises: #3, 5, 9, 13, 16, 19

*The instructions preceding these exercises are garbled. The domains are **not** simply connected (except in the case of #22), but, nevertheless, all one needs to do is **find** a potential function.

This syllabus allows 5 days for tests and review (based on a 45-day semester). Problems listed in brackets are best saved for the better students, as are the recommended "Additional and Advanced Exercises." Problems listed in boldface are in the WeBWork problem bank for the course.

For instructors, please see

`http://www.math.uga.edu/~curr/Advising/WeBWork.pdf`

(from a math department IP address only).

To see about using MyMathLab and an on-line version of the text, see

`http://www.pearsonhighered.com/product?isbn=9780321694553`.