

640:251 L 25-27 Multivariable Calculus

Text: Jon Rogawski, *Calculus Early Transcendentals*, W. H. Freeman and Company, ISBN 1-4292-1113-X.

Lectures: MW5 3:20 PM - 4:40 PM [LSH-A142](#) LIV

Prof: Siddhartha Sahi sahi@math.rutgers.edu Off. Hrs: W 2-3 PM LSH-B102B

Workshops:

18696 25 Th2 10:20 AM - 11:40 AM [ARC-108](#) BUS

18697 26 Th1 8:40 AM - 10:00 AM [ARC-206](#) BUS

18698 27 Th4 1:40 PM - 3:00 PM [SEC-216](#) BUS

TA: Thomas Robinson thomasro@math.rutgers.edu Off. Hrs: F 2-3 PM Hill 611

Class and Homework Schedule:

Date	Lec	Topic(s)		Date	Lec	Topic(s)		Date of Workshop	HW due on Lects.
9/1	1	12.1, .2		9/8	2	12.3, .4		9/9	1
9/13	3	12.5		9/15	4	13.1, .2		9/16	2,3
9/20	5	13.3, .4, .5		9/22	6	14.1, .2		9/23	4,5
9/27	7	14.3, .4		9/29	8	14.5		9/30	6,7
10/4	9	14.6		10/6	10	14.7		10/7	8,9
10/11	11	14.8		10/13	12	exam 1		10/14	10,11
10/18	13	15.1		10/20	14	15.2		10/21	13
10/25	15	15.3		10/27	16	12.7		10/28	14,15
11/1	17	15.4		11/3	18	15.5		11/4	16,17
11/8	19	16.1		11/10	20	16.2		11/11	18,19
11/15	21	16.3		11/17	22	exam 2		11/18	20,21
11/22	23	16.4		11/24		break			
11/29	24	16.5		12/1	25	17.1		12/2	23,24
12/6	26	17.2		12/8	27	17.3		12/9	25,26,27
12/13	28	catch up		12/16	8am	final			

Homeworks: The only way to learn mathematics is by solving problems. Therefore the students are expected to do **all** the assigned problems and hand them in to the TA during the workshop on Thursday. The TA will grade randomly selected problems and also assign points for overall completeness.

Quizzes: There will be short quizzes each Wednesday (on the homework material due on Thursday.)

Grading:

Component	Points
Finals	200
Exam 1	100
Exam 2	100
Homework	50
Workshops	40
Maple	40
Quizzes	30
Total	560

Homework assignment:

Lec	Topic(s) and text sections	Suggested problems
1	12.1 Vectors in the Plane 12.2 Vectors in Three Dimensions	12.1: 5, 9, 11, 15, 21, 40, 47 12.2: 11, 13, 19, 25, 27, 31, 51
2	12.3 Dot Product and the Angle Between Two Vectors 12.4 The Cross Product	12.3: 1, 13, 21, 29, 31, 52, 57, 63 12.4: 1, 5, 13, 20, 25, 26, 43, 44
3	12.5 Planes in Three-Space	12.5: 1, 9, 11, 15, 25, 31, 53
4	13.1 Vector-Valued Functions 13.2 Calculus of Vector-Valued Functions	13.1: 5, 13, 15, 18 13.2: 4, 14, 30, 31, 33, 41, 49
5	13.3 Arc Length and Speed 13.4 Curvature 13.5 Motion in Three-Space	13.3: 3, 9, 13, 14 13.4: 1, 7, 17, 21 13.5: 3, 6, 32
6	14.1 Functions of Two or More Variables 14.2 Limits and Continuity in Several Variables	14.1: 7, 20, 23, 27, 36, 40 14.2: 5, 15, 27, 35
7	14.3 Partial Derivatives 14.4 Differentiability, Linear Approximation and Tangent Planes	14.3: 3, 19, 21, 39, 47, 50, 53 14.4: 3, 4, 7, 15, 27, 33
8	14.5 The Gradient and Directional Derivatives	14.5: 7, 13, 27, 31, 33, 37, 39, 43
9	14.6 The Chain Rule	14.6: 1, 5, 7, 17, 20, 23, 27, 30
10	14.7 Optimization in Several Variables	14.7: 1, 3, 7, 17, 19, 24, 25, 27, 29
11	14.8 Lagrange Multipliers: Optimizing with a Constraint	14.8: 2, 7, 11, 13, 15
12	Exam 1 (timing approximate!)	
13	15.1 Integration in Several Variables	15.1: 10, 15, 23, 25, 33, 37, 44
14	15.2 Double Integrals over More General Regions	15.2: 3, 5, 11, 25, 32, 37, 43, 45, 49, 59
15	15.3 Triple Integrals	15.3: 3, 5, 11, 15, 17, 25, 33
16	12.7 Cylindrical and Spherical Coordinates	12.7: 1, 5, 23, 31, 41, 43, 48, 53
17	15.4 Integration in Polar, Cylindrical, and Spherical Coordinates	15.4: 1, 5, 9, 19, 23, 27, 31, 37, 39, 42, 47, 51, 59
18	15.5 Change of Variables	15.5: 1, 5, 14, 15, 21, 29, 33, 37
19	16.1 Vector Fields	16.1: 1, 3, 10, 17, 23, 27
20	16.2 Line Integrals	16.2: 3, 9, 13, 21, 27, 35, 39, 40
21	16.3 Conservative Vector Fields	16.3: 1, 5, 9, 13, 17, 19, 21
22	Exam 2 (timing approximate!)	
23	16.4 Parametrized Surfaces and Surface Integrals	16.4: 1, 5, 8, 11, 19, 21, 37

24	16.5 Surface Integrals of Vector Fields	16.5: 1, 6, 9, 12, 15, 17, 23
25	17.1 Green's Theorem	17.1: 1, 3, 6, 9, 12, 23, 27
26	17.2 Stokes' Theorem	17.2: 1, 5, 9, 11, 19, 23
27	17.3 Divergence Theorem	17.3: 1, 5, 7, 11, 14, 15, 18
28	Catch up & review;	