

Course Guide Multivariate Calculus: Math 231: Fall 2026

Date	Topic		Notes	Assignment
M: 8-24	vectors, points, components	9 - 18		
T:	dot products, angles, projections	18 - 28		
W:	dot products, angles, projections	18 - 28		
R:	cross product	28 - 37		
F:	Lines and planes	38 - 50		
M: 8-31	Lines and planes	38 - 50		Mission 1
T:	Curves and Surfaces	51 - 75		
W:	curvilinear coordinates	75 - 83		
R:	calculus of curves	89 - 101		
F:	Arclength	101 - 105		
M: 9-7	geometry of curves	105 - 115		Mission 2
T:	geometry of curves	105 - 115		
W:	3D motion	115 - 125		
R:	Integration along a curve	130 - 134		
F:	Henchmen Fight I: (25pts)			Mission 3
M: 9-14	Questions			
T:	BOSS FIGHT I		Covers Chapters 1 and 2 of my notes.	
W:	open sets and limits for several variables	137 - 142		
R:	open sets and limits for several variables	143 - 148		
F:	directional derivatives & partial differentiation	149 - 157		
M: 9-21	directional derivatives via partial differentiation	158 - 162		
T:	gradient vector field, level curves, contour plots	162 - 169		Mission 4
W:	partial diff. with three-variables & applications	170 - 179		
R:	general concept of differentiation & chain rules	180 - 205		
F:	chain rules	192 - 205		
M: 9-28	tangent spaces & their equations	206 - 212		
T:	tangent spaces & their equations	206 - 212		Mission 5
W:	differentials and constrained partial diff.	212 - 219		
R:	gradients in curvilinear coordinates	220 - 222		
F:	Lagrange multipliers	231 - 245		
M: 10-5	Lagrange multipliers	231 - 245		Mission 6
T:	multivariate Taylor	246 - 251		
W:	second derivative test	252 - 257		
R:	closed set test	258 - 262		
F:	Henchmen Fight II: (25pts)			Mission 7

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M: 10-12	Questions			
T	BOSS FIGHT II			
W	definition and basic multivariate integrals	265 - 270		
Fall Break	no class 10-15 & 10-16			
M: 10-19	double integrals and TYPE I and II regions	270 - 285		
T:	cartesian triple integrals	286 – 295		
W:	change of variables for double integrals	295 - 307		
R:	change of variables for triple integrals	308 - 319		
F:	algebra and geometry of volume elements	320 - 322		
M: 10-26	further examples of multivariate integration	265 - 322		
T:	vector fields and the gradient operator	325 – 328		Mission 8
W:	On the calculation and properties of grad, curl and div	329 – 332		
R:	line integrals	332 – 335		
F:	conservative vector fields	335 – 338		
M: 11-2	conservative vector fields	335 – 338		
T:	Green's theorem	339 - 345		
W:	Green's theorem	339 - 345		
R:	Deformation theorem, conservative vector fields	345 – 353		Mission 9
F:	Deformation theorem, conservative vector fields	345 – 353		
M: 11-9	Surface integrals	354 – 364		
T:	Surface integrals	354 – 364		
W:	Surface integrals	354 – 364		
R:	Surface integrals	354 – 364		
F:	HENCHMEN FIGHT III: (25pts)			Mission 10
M: 11-16	Questions ?			
T:	BOSS FIGHT III			
W:	Questions ?			
R:	Final Boss Fight part I		(covers Boss Fight I, II, III material)	
F:	Final Boss Fight part II		(covers Boss Fight I, II, III material)	
	Thanksgiving Break (November 23-27)			
M: 11-30	Stokes' theorem & Gauss' Theorem	365 – 383		
T:	Stokes' theorem & Gauss' Theorem	365 – 383		
W:	Stokes' theorem & Gauss' Theorem	365 – 383		
R:	Stokes' theorem & Gauss' Theorem	365 – 383		
F:	Theory of Potentials	384 – 400		
M: 12-7	Theory of Potentials	384 – 400		Mission 11

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T:	Calculus with Differential Forms part I	401 – 425		
W:	Calculus with Differential Forms part II	401 – 425		
R:	Calculus with Differential Forms part III	401 – 425		
F:	HENCHMEN FIGHT IV: (25pts)			Mission 12
M: 12-14	Questions about Final Boss Fight			
T:	Final Boss Fight part III		(comprehensive)	

1. Grading: usual 1000pts scale with:

Boss Fight I = 150pts,

Boss Fight II = 150pts,

Boss Fight III = 150pts,

Missions = 200pts, (some bonus to earn here, I'll keep the highest 11 scores)

Henchmen Fights = 100pts,

Final Boss Fight = 250pts.

Modified Schedule Remark: The point values indicated above assume that the assignments are taken residentially in the usual classroom or the Testing Center (if you have ODAS accommodations for such). In the case that these are taken in-person, in the usual fashion, it is possible to replace Boss Fight 1, 2 or 3 with the Final Boss Fight grade if helpful. However, if the Final Boss Fight is not offered as a residentially-proctored exam (for example, if the university was to go “virtual” after Thanksgiving Break) then

- If parts 1 and 2 of the Final Boss Fight were given in a residentially-proctored manner then part 3 of the Final Boss Fight is only worth 50pts and the values of Parts 1 and 2 are rescaled to be worth a total of 250pts. Then parts 1 and 2 of the Final Boss Fight can be used to replace Boss Fights 1, 2 or 3 (provided the student made a good faith effort to take them earlier in the term, or has a university approved absence)
- If all the Final Boss Fight parts are not able to be given in a residentially-proctored manner, then the value of the Final Boss Fight reduces to 90pts and the values of Boss Fights 1, 2 and 3 increase to 220pts each (none of which can be dropped, unless there is a university approved absence in which case a special accommodation will be arranged for the student to take the missed test at a proctored testing center of their choosing)

Hopefully the schedule will not be modified, and I reserve the right to further modify the grade scaling for the course even if there is no schedule modification. I usually make modifications which benefit the students, so, you'd like me to insist on keeping this flexibility.