

Marshall University Syllabus Department of Mathematics MTH 231-202 Spring 2023

Course Title:	Calculus with Analytic Geometry III		
Course Number:	MTH 231 Section 202 CRN 4085 Credit: 4 Hours		
Textbook:	Calculus, Early Transcendental by Stewart, Eighth Edition		
Sections Covered:	12.1-12.6, 13.1-13.4, 14.1-14.8, 15.1-15.4, 15.6-15.9, 16.1-16.4		
Course	Vectors, curves, and surfaces in space. Derivatives and integrals of functions of		
Description:	more than one variable. A study of the calculus of vector valued functions.		
Calculator:	Graphing calculator is recommended. TI-83 is recommended by the department.		
	However, graphing calculator may not be allowed for some problems on exams.		
Prerequisites:	MTH 230 with "C" or higher		
Meeting Time:	MTWR: 2:00 – 2:50 PM		
Classroom:	Smith Hall 514		
Instructor:	Dr. Basant Karna		
Office:	Smith Hall 715		
Office Hours:	MW: 1:00-2:00 PM, TR: 12:00-2:00 PM (Others by appointment)		
Phone/Email:	Phone: (304) 696-4332		
	Email: <u>karna@marshall.edu</u>		
Course	Student will learn to calculate and apply limits to calculate with vectors to		
Objectives:	calculate partial and total derivatives and to interpret them as rates of change to		
o sjeen (est	calculate multiple integrals. line integrals and surface integrals: and to interpret		
	them as accumulations and limits of sample sums, to apply integrals to word		
	problems, to apply derivatives and integrals to parametric curves, to work with		
	rectangular, polar, cylindrical and spherical coordinates.		
Course Contents.	Chapters $12 - 16$ in the textbook:		
course contents.	Vectors Geometry: Vectors the dot product the cross product equations of		
	lines and planes, cylinders and quadric surfaces, etc.		
	Vector-Valued Functions: Vector functions and space curves, derivatives and		
	integrals of vector functions, arc length and curvature, motion in space, etc.		
	Partial Derivatives: Functions of several variables, limits and continuity, partial		
	derivatives, tangent planes and linear approximation, the chain rule, directional		
	derivatives, etc.		
	Multiple Integration: Double and triple integrals, iterated integrals, cylindrical		
	and spherical coordinates, change of variables, etc.		
	Line and Surface Integrals: Vector fields, line integrals, the fundamental		
	theorem of line integrals, Green's theorem, curl and divergence, parametric		
	surfaces and their areas, surface integrals, Stokes' theorem, etc.		
Academic	For beginning, ending, and add/drop dates, see the Marshall University		
Calendar:	Academic Calendar (URL: http://www.marshall.edu/academic-calendar/).		

The table below shows the following relationships: How each student learning outcome will be				
practiced and assessed in the course.				
Course student learning outcomes		How students will practice in this course	How student achievement will be assessed in this course	
Students will learn about:		Homework assignments	Class quizzes	
- vectors and applicat	tions	Class work	Homework assignments	
- equations of parame	etric lines and planes	Board work	Quizzes	
- computing arc lengt	th, surface area, volume	In-class exercises	Major exams	
- applications of derivatives of curves and		Test reviews	Final exam	
functions of several	variables			
- applications of integ	grals of functions of			
several variables				
- applications of vector fields				
Attendance Policy:	Attendance is required. H	Having more than 25% abser	nces may result in a course	
	grade of F ! Absences wh	ich can be excused include (COVID-19 related absences,	
	illness, emergencies, or p	participation in another unive	rsity activity. Excused	
Care Ray Dell'and	absences must be approv	ed by the office of the dean of	of students.	
Grading Policy:	A. Exams: There will be D. Homowork Drohlomov	2 exams given in class.	will be given and collected	
	D. HOMEWORK Problems: TO HOMEWORK assignments will be given and collect		exercises and being aware	
	of the dates for the major	exams	excretises, and being aware	
	C. Final Exam: There wi	ll be a two-hour final exam o	on April 24.	
Points	Attendance/Teaching Eval 30 Pts			
Distribution:	Distribution: Homework		100 Pts	
	Exams	200 Pts		
	Final Exam	100 Pts		
	Total Pts:	430 Pts		
Grades	The semester grade will be based on the percentage of the 430 total possible		f the 430 total possible	
	points, using the following scale.			
	A: 90 -100 %, B: 80 - 89 %, C: 70 - 79 %, D: 60 - 69 %, F: 0 - 59 %		59 %, F: 0 – 59 %	
	Note: The class score wi	ill be posted on		
Malaa	https://www.marshall.ed	lu/design-center/	: f ; f ; _ ; , _ ; _ ; , _ ; _ ; , _ _ ; , _ ; , _ ; , _ ; , _ _ ; , _ ; ,	
Make-ups:	A. <i>Exams</i> : Making up a f	A. <i>Exams</i> : Making up a missed exam is possible only if you receive prior		
	B <i>Final</i> : If you don't tak	e final exam you will receive	we "F" for the class	
Exam Dates:	Exam 1 – February 9 Ex	cam 2 – March 23 (Thursday)	s)	
	Final Exam: April 24 @	12:45 PM (Monday)	<u>-</u> /	
Important Dates:	• January 16, Monday –	MLK, Jr. Holiday		
•	• January 17, Tuesday –	"W" Withdrawal period beg	ins	
	• March 13, Monday - M	Iarch 17, Friday– Spring Bre	ak	
	• April 14, Monday – La	ast day to drop		
	• April 21, Friday – Last	t class day		
Disruptive	If your actions become di	sruptive or distracting for me	e or another student, you will	
Actions:	be asked to cease your	be asked to cease your behavior. Disruptive behavior may include but are not		
	limited to the following:	cell phone use in class, talki	ng during class, and the use	
	ot iPods or MP3 players	during class. These will cour	nt as unexcused absences .	
Coming Late:	Students should join on t	ime and stay in the class for	entire class.	

University	By enrolling in this course, you agree to the University Policies. Please read the			
Policies:	full text of each policy (listed below) by going to MU Academic Affairs:			
	University Policies. (URL: http://www.marshall.edu/academic-affairs/policies/)			
	 Academic Dishonesty Policy Academic Dismissal Policy Academic Forgiveness Policy Academic Probation and Suspension Policy Affirmative Action Policy Dead Week Policy D/F Repeat Rule Excused Absence Policy for Undergraduates Inclement Weather Policy Sexual Harassment Policy 			
	 Students with Disabilities (Policies and Procedures) 			
	University Computing Services Acceptable Use Policy			

Course Schedule

Week	Sections	Topics
1	12.1 - 12.3	Review of vectors, dot product, angle, projection
2	12.4 - 12.5	Cross product, planes
3	12.6 - 13.1	Quadric surfaces, vector functions
4	13.2 - 14.1	Arc length & curvature, Multivariable functions
5	14.2, Review	Limits and continuity, Exam 1 on February 9
6	14.3 - 14.4	Partial derivatives, Tangent planes
7	14.5 - 14.6	Multivariable chain rule, Directional derivatives, Gradient
8	14.7 - 14.8	Optimization, LaGrange multipliers
9	15.1, 15.2	Double integration over general regions
10	No Class	March 13, Monday- March 17, Friday – Spring Break
11	15.3, Review	Double integration in polar coordinates, Exam 2 on March 23
12	15.4 - 15.6	Applications, Surface area, Triple integrals
13	15.6 - 15.8	Triple integrals in other coordinates
14	16.1 – 16.3	Vector fields, Line integrals, Fundamental Theorem for Line Integrals
15	16.4, Review	Green's Theorem, Review for final exam
16	Final Exam	Final Exam on Monday, April 24, 12:45 – 2:45 PM

Note: Homework assignments are posted on the blackboard.

Health and Safety Information

All members of the Marshall University community are expected to always observe health and safety protocols. This includes general health and safety protocols as well as specific protocols that might emerge in response to community and campus health conditions.

<u>Recomm</u>	Recommended Problems		
Sections	Problems		
12.1	4, 8, 9, 12, 15, 20, 32, 36		
12.2	4, 6, 9, 14, 17, 20, 22, 26		
12.3	2, 5, 8, 10, 13, 22, 24, 26, 30, 39, 44, 49, 53		
12.4	3, 6, 8, 9, 10, 13, 14, 17, 19, 20, 28, 30, 32, 34, 35, 38		
12.5	1, 3, 5, 7, 9, 12, 14, 15, 18, 20, 24, 26, 28, 31, 33, 37, 40, 45, 48, 50, 72, 74, 78		
12.6	1, 3, 11-20 (odd), 21-27, 30		
13.1	2, 4, 5, 7, 10, 17, 21-26, 27		
13.2	4, 5, 9, 10, 12, 13, 17, 19, 21, 23, 25, 35, 39		
13.3	1, 4, 5, 7, 9, 17, 18, 22, 29, 30		
	Exam 1 on February 9 (Thursday)		
14.1	2, 5, 9, 12, 15, 21, 24, 29, 32, 39, 42, 59-64		
14.2	6, 8, 12, 15, 21, 30, 37		
14.3	5, 7, 11, 15, 19, 21, 24, 31, 34, 36, 42, 48, 53, 63, 65		
14.4	1, 3, 5, 11, 13, 15, 19, 25, 26, 31, 32		
14.5	2, 4, 6, 7, 10, 12, 13, 21, 23, 26, 28, 31, 34		
14.6	5, 7, 9, 11, 15, 17, 21, 23, 25, 29, 33, 41, 44, 46		
14.7	1, 5, 6, 7, 9, 11, 14, 19, 29, 31, 33, 39, 44, 48		
14.8	4, 6, 10, 29		
	Exam 2 on March 23 (Thursday)		
15.1	1(a), 4, 8, 11, 12		
15.2	3, 4, 6, 10, 13, 15, 19, 20, 21, 23, 25, 26, 30		
15.3	1, 3, 4, 7, 8, 9, 11, 12, 13, 14, 17, 18, 19, 20, 22, 23, 25, 26, 31, 43, 49, 50, 55		
15.4	1-4, 6, 7, 8, 10, 11, 15, 19, 20, 21, 22, 29, 31		
15.6	1, 3, 4, 6, 7, 10, 11, 12		
15.7	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 13, 17, 18, 19, 21, 22, 35		
15.8	1, 2, 3, 4, 5, 8, 10, 11, 17, 18, 19, 21, 23, 29, 30		
16.1	4, 8, 11-14, 15-18, 21, 23		
16.2	1, 3, 4, 7, 9, 12, 13, 15, 19, 20, 21, 22, 39		
16.3	3, 5, 6, 7, 9, 12, 13, 15, 17, 18, 23, 29		
16.4	1, 3, 5, 7, 9, 11		
	Final Exam on April 24 (Monday)		