Math 2415.002 - Multivariate Calculus, Fall 2023
MWF 10:30 - 11:45 am (Fully Face-to-Face Format)
RBN 4025

Instructor:	Dr. Maddie Dawsey
Office:	RBN 4048
Office Hours:	TuTh 8:30 - 10:30 am (or by appointment)
Email:	mdawsey@uttyler.edu (I will NOT receive emails to mdawsey@patriots.uttyler.edu)
Website:	All course materials will be posted on Canvas

Textbook

Calculus: Volume 3, by OpenStax.

This is an open-access textbook, so it is freely available here: https://openstax.org/details/books/calculus-volume-3. You can read it online, download a PDF version, or buy a print copy for about $25 (paperback) or $40 (hardcover). Dr. Dawsey recommends having the online or PDF option on your device.

Course Description

Vector calculus in Euclidean n-space, functions of several variables, partial differentiation, and multiple integration. The prerequisites are: A grade of C or better in Calculus II (Math 2414 or equivalent).

Student Learning Outcomes

Upon completion of this course, students should be able to do the following:

- Use vectors to describe lines, planes, and curves

- Apply the operations of calculus to multivariable functions

- Solve problems using the Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, and the Divergence Theorem

- Solve real world problems using multivariable techniques

Important Dates

September 1st	Census Date
September 4th	Labor Day Holiday
October 30th	Withdrawal Deadline
November 20th - 24th	Thanksgiving Holiday
December 4th - 9th	Final Exams

Grading Scheme

Your final letter grade will be determined by the following grading scheme:

		A	90 - 100
Homework	15%	B	80 - 89.99
Midterm Exams	20% each	C	70 - 79.99
Final Exam	25%	D	60 - 69.99
		F	0 - 59.99

Attendance (Fully Face-to-Face Format)

Students are expected to attend every lecture in person and are responsible for any announcements made during lecture. The course moves quickly, and any absence will be detrimental to the student's performance.

Homework (15%)

Homework will be assigned from the textbook and posted on Canvas after each class. Homework will be submitted on Canvas once each week, every Monday at the beginning of class, unless otherwise stated by the professor. Your lowest two homework grades will be dropped at the end of the semester.

If you know that you will have to miss class on a day that homework is due, then it is your responsibility to turn in the homework early. Homework that is turned in late or not at all will earn a grade of zero.

Exams (60%)

There will be three midterm exams during the semester. Each midterm exam will be worth 20% of the final course grade. The tentative exam schedule is:

Exam 1	Wednesday, September 20th
Exam 2	Friday, October 13th
Exam 3	Friday, November 17th

Make-up exams for documented absences that are required as part of a UT Tyler obligation (e.g. collegiate athletes participating in an event, etc.) or for religious observation will be granted. For all make-ups of this type, prior notification and documentation are required. Other make-ups will be granted only in extreme cases and at the sole discretion of the instructor.

Projects (Optional)

There will be 3 optional projects assigned throughout the semester, aligned with the midterm exams. These projects will involve applications of what we've learned to real-life problems and/or more advanced topics than we'll cover in class. You will have 1 week to complete each project after the corresponding exam, and projects that are turned in late will not be graded. Each project that you choose to complete will count as 25% of your corresponding midterm exam grade, if this improves your grade.

For example: Suppose you earn a grade of 70% on Exam 1. You have two options:

- Accept your Exam 1 grade of 70%.

- Complete Project 1.
  If you earn a grade of 100% on Project 1, then your Exam 1 grade will become $70 \cdot 0.75 + 100 \cdot 0.25 = 77.5$.
  If you earn a grade below 70% on Project 1, then your Exam 1 grade will remain 70%.

Final Exam (25%)

The final exam will be at the assigned time during final exams week. More detailed information about the time and location will become available closer to the end of the semester. The final exam will be cumulative.

Technology

Students will be required to have a device capable of internet access and access to Canvas. The use of calculators and other electronic devices, including cell phones, is not permitted during exams.

Student Resources

The Mathematics Learning Center, RBN 4021, is an open access computer lab for math students. There are tutors on duty to assist students who are enrolled in early-career courses. More information, including a current schedule, can be found here: https://www.uttyler.edu/math/math-learning-center.

The PASS Tutoring Center, located in LIB 401, also offers free tutoring for early-career courses and has walk-in hours. More information, including a current schedule and instructions for making tutoring appointments, can be found here: https://www.uttyler.edu/tutoring.

University Policies

For university policies concerning Students' Rights and Responsibilities, Grade Replacement/Forgiveness, State-Mandated Course Drop Policy, Disability Services, Student Absence due to Religious Observance, Student Absence for University-Sponsored Events and Activities, Campus Carry, Social Security and FERPA Statement, please see https://www.uttyler.edu/academicaffairs/files/syllabuspolicy.pdf.

Tentative Schedule

WEEK	DAY	PLANNED MATERIAL
Week 1 8/21–8/25	Monday	Introduction to 3-Dimensional Coordinate Systems
	Wednesday	Sections 2.1-2.2: Vectors
	Friday	Section 2.3: The Dot Product
Week 2 8/28–9/1	Monday	Section 2.4: The Cross Product
	Wednesday	Section 2.5: Equations of Lines in Space
	Friday	Finish Section 2.5: Equations of Planes in Space
Week 3 9/4–9/8	Monday	*Labor Day Holiday*
	Wednesday	Sections 2.6-2.7: Quadric Surfaces and Cylindrical/Spherical Coordinates
	Friday	Sections 3.1-3.2: Vector-Valued Functions and Space Curves
Week 4 9/11–9/15	Monday	Section 3.3: Arc Length and Curvature
	Wednesday	Section 3.4: Motion in Space
	Friday	Section 4.1: Multivariable Functions
Week 5 9/18–9/22	Monday	Section 4.2: Limits and Continuity
	Wednesday	**Exam 1 (Chapters 2-3 and Section 4.1)**
	Friday	Section 4.3: Partial Derivatives
Week 6 9/25–9/29	Monday	Section 4.4: Tangent Planes and Linear Approximations
	Wednesday	Section 4.5: The Chain Rule
	Friday	Section 4.6: Directional Derivatives and the Gradient
Week 7 10/2–10/6	Monday	Section 4.7: Maxima/Minima Problems
	Wednesday	Section 4.8: Lagrange Multipliers
	Friday	Finish Section 4.8
Week 8 10/9–10/13	Monday	Section 5.1: Double Integrals over Rectangular Regions
	Wednesday	Section 5.2: Double Integrals over General Regions
	Friday	**Exam 2 (Chapter 4 and Section 5.1)**
Week 9 10/16–10/20	Monday	Section 5.3: Double Integrals in Polar Coordinates
	Wednesday	Finish Section 5.3
	Friday	Section 5.4: Triple Integrals
Week 10 10/23–10/27	Monday	Section 5.5: Triple Integrals in Cylindrical and Spherical Coordinates
	Wednesday	Finish Section 5.5
	Friday	Section 5.7: Change of Variables in Multiple Integrals
Week 11 10/30–11/3	Monday	Section 6.1: Vector Fields
	Wednesday	Section 6.2: Line Integrals
	Friday	Finish Section 6.2
Week 12 11/6–11/10	Monday	Section 6.3: Conservative Vector Fields
	Wednesday	Finish Section 6.3
	Friday	Section 6.4: Green's Theorem
Week 13 11/13–11/17	Monday	Section 6.5: Divergence and Curl
	Wednesday	Section 6.6: Parametric Surfaces and Their Areas
	Friday	**Exam 3 (Chapter 5 and Sections 6.1-6.5)**
Week 14 11/20–11/24	Monday	*Thanksgiving Holiday*
	Wednesday	*Thanksgiving Holiday*
	Friday	*Thanksgiving Holiday*
Week 15 11/27–12/1	Monday	Finish Section 6.6: Surface Integrals
	Wednesday	Finish Section 6.6
	Friday	Section 6.7: Stokes' Theorem
Week 16		Cumulative Final Exam