MATH 120: Multivariable Calculus

Summer 2025

Instructor:	Tam Cheetham-West	**Time:**	MWF 10 am - 11:30 am EST
Office:	Zoom (info on Canvas)	**Classroom:**	Zoom (info on Canvas)
Office Hours:	MF 11:40 am - 12:40 pm EST	**Email:**	tamunonye.cheetham-west@yale.edu

Course Content: In Math 120, one mostly studies the geometry and calculus of three-dimensional objects. No prior experience with multivariable calculus is necessary. However, a solid foundation in single variable calculus is needed for this class. Some of the topics include: the vector geometry of three dimensions, scalar and vector functions of one and two variables, partial derivatives, directional derivatives, multiple integrals, cylindrical and spherical coordinates, parameterized curves and surfaces, gradient, divergence, curl, line and surface integrals, and the theorems of Gauss, Green, and Stokes. The course is fast-paced and so it is important to keep up with the assignments and reading to do well.

Prerequisites: The prerequisite for this course is integral calculus (at the level of AP Calculus BC or equivalent). One may also place into Math 120 via the placement exam.

Textbook: James Stewart's *Multivariable Calculus Early Transcendentals*, 8th edition, Cengage Learning.

Homework: There will be weekly homework assignments. You must write up your solutions on your own, and in your own words. Homework solutions should be neat, readable, and in complete sentences. Late homework will not be accepted. Written homework will be submitted via Gradescope.

Attendance: Class attendance is mandatory.

Exams: There will be two midterm exams on **July 9** and **July 23**. There will also be a final on the last day of class **August 2**. These will be timed remote tests submitted via Gradescope.

Grading: The course grade will be based on homework, two midterm exams, and the final exam. Your course score will be determined from your course score, which will be the higher of the following two options

	Homework	Midterm score	Final
Option 1	20%	45%	35%
Option 2	20%	35%	45%

Table 1: Determining your course score

Your midterm score (above) is itself the higher of the following two options

	Midterm 1	Midterm 2
I	40%	60%
II	60%	40%

Table 2: Determining your Midterm score

Grade	Cutoffs %
A/A-	$\geq$90
B+/B/B-	≥ 80
C+/C/C-	≥ 65
D	≥ 50
F	≥ 0

Table 3: Letter grade cutoffs

Translating your course score to a letter grade, I will use cutoffs in Table 3 above. These cutoffs are guaranteed. For example, if you get a 90% at the end of the class you are guaranteed an A- or better.

Office Hours: I will hold two office hours per week, where I encourage you to bring comments, questions, and ideas about the lectures, the homework problems, or anything related to the course. Office hours will take place virtually on Mondays and Fridays from 11:40 am -12:40 pm EST (bit.ly/Yale120Zoom).

Accessibility: My aim is to make this course accessible to every student and deliver content in ways that support individual learning needs. Please reach out to me if you encounter any barriers in the course. If you need and are not currently receiving exam accommodations (additional time, breaks, scribing, large-text, etc.), reach out to Student Accessibility Service as soon as possible. If you need help navigating the accommodations process, check out the Disability Empowerment for Yale (DEFY). If you need additional support to manage mental health concerns, reach out to Mental Health and Counseling, the Yale Psychology Department Clinic, the Good Life Center, or Walden Peer Counseling.

Tentative schedule:

	Topics to cover	Section in textbook	Event of note
6/30	Vectors & Dot product	12.1-12.3	
7/2	Equations of lines and planes	12.4-12.5	
7/4	Space curves, derivatives and Integrals	13.1-13.2	PSet 1 due
7/7	Arc length and motion of particles	13.3-13.4	
7/9	Limits & Continuity for multi. functions	14.1-14.2	**Midterm 1** (on Sections 12.1-13.4)
7/11	Partial derivatives & Linear Approximation	14.3-14.4	PSet 2 due
7/14	Directional derivatives & Gradient	14.5-14.6	
7/16	Optimization and the 2nd derivative test	14.7	
7/18	The Lagrange multiplier method	14.8	Pset 3 due
7/21	Double and triple integrals over boxes	15.1,15.2,15.6	
7/23	Double integrals in polar coordinates	15.3-15.5	**Midterm 2** (on Sections 14.1-14.8)
7/25	Vector fields & line integrals	16.1-16.4	PSet 4 due
7/28	Surface area, surface integrals, and Stokes' theorem	16.6-16.8	
7/30	Divergence and the Divergence Theorem	16.9	PSet 5 due
8/1	—(no class today, Review session on 7/31)		**Final** (cumulative)

Table 4: Class schedule