MATH 231: Multivariable Calculus

Fall 2020   **Oberlin College**

Lecture Information:
Meeting Times:

- *Section 1:* MWF, 10:10–11:00 AM
- *Section 2:* MWF, 11:20 AM–12:10 PM

Location: Science Center N292

Instructor:
Nathan Gray
Office: King 120B
Office Hours: TBA
Email: ngray@oberlin.edu

Prerequisites: A passing grade in MATH 134, or its equivalent, is required.

Textbook (required): James Stewart, *Multivariable Calculus,* 8th ed., Cengage Learning, 2016. We will cover much of Chapters 12–16.

Course Description: In this course, we will extend the concepts and techniques covered in single-variable calculus (MATH 133, 134) by studying functions of two or more variables. The main topics include:

- (Chapter 12) vectors; lines and planes; quadric surfaces
- (Chapter 14) continuity; partial differentiation; gradients; directional derivatives; local/global extrema
- (Chapter 15) double integrals; double integrals using polar coordinates; triple integrals; triple integrals using cylindrical or spherical coordinates; change of variables
- (Chapter 16) vector fields; line integrals; Fundamental Theorem for Line Integrals; Green's Theorem.

Time permitting, additional topics include: surface integrals; surface integrals over parameterized surfaces; Stokes' Theorem; the Divergence Theorem.

Homework, Quizzes, Exams:

Homework: There will be (almost) weekly homework assignments. The two lowest homework grades will be dropped at the end of the semester. Assignments must be submitted through Gradescope (see page 2).

Students are expected to complete the assignments on their own. However, collaboration with classmates *before the write-up* is acceptable and encouraged, as long as each student writes and submits their own work. Collaboration during the write-up stage of an assignment, or handing in an assignment that is practically identical to a fellow classmate's work, is cheating and may result in a grade of zero for the assignment. Late homework is not accepted.

Quizzes: Every so often, a quiz will be posted to Blackboard (see page 2). Each quiz will be on the latest material covered.

Exams: There will be two midterm exams (part in-class, part take-home) and a cumulative final exam.

Grading Policy: Course grades will be based on homework, quizzes, and exams. Every student's grades are a reflection of the student's mastery of the course material and the student's ability to communicate that mastery through written work.

Earning 90%, 80%, and 70% of the total points in the course will result in course letter grades *no stricter than* A−, B−, and C−, respectively. The boundaries (cut-offs) between letter grades may be relaxed at the instructor's discretion, depending on the distribution of course numeric grades. This grading scheme rewards hard work, leaving little room for miraculous recovery.

Category	Grade Basis	Weight (each)	Weight (total)
Homework	lowest 2 dropped		20%
Quizzes			10%
Exams (×2)		20%	40%
Final Exam		30%	30%
Total			100%

Course Load: Oberlin College complies with federal regulations defining a credit hour. In this course, all students are expected to have 12 hours per week of academically engaged time throughout the semester. This amounts to 8–9 hours per week of additional academic work outside of lectures.

Technology:

Blackboard: All course materials (e.g., homework, handouts, notes) will be made available via the MATH 231 course site on Blackboard.[*] Students should check into Blackboard a few times each week.

Gradescope: This course will use the website Gradescope in order to provide fast and accurate feedback on students' work.[†] Homework will be submitted and graded through Gradescope. Once the grades are posted, students will be notified immediately so that they can log in and see their feedback. Each student may also submit regrade requests if they feel that the grader has made a mistake.

After the instructor registers students into Gradescope, students should log in using their Oberlin email addresses. The initial password for each student can be changed at gradescope.com/reset_password. The same link can be used if students need to set their passwords for the first time.

CalcPlot3D: This course will sometimes use CalcPlot3D, a Java-based applet that runs on Internet browsers.[‡] CalcPlot3D will be used for computational purposes or for visualizing certain geometric objects that arise in lectures. Students are encouraged, but not required, to experiment with CalcPlot3D over the semester. (Other tools that students may experiment with include Wolfram Alpha[§] and Mathematica.)

Calculators: All electronic devices, except for *non-programmable scientific calculators,* are banned from use during exams.

Schedule: A tentative schedule can be found on the course Blackboard site. It will be updated frequently.

Attendance, Make-Up Policy: Students should understand the importance of attending lectures and doing the assigned work.

A student who misses a lecture is responsible for any announcements made during that time. Moreover, *late homework is not accepted.* A legitimate absence due to a recognized Oberlin-related activity, a religious holiday, a verifiable illness, or an emergency will be reviewed on an individual basis. If a student must miss an exam, they must obtain permission from the instructor in advance.

With that said, students that are sick should notify the instructor and stay home.

Disability Accommodations: Oberlin College is committed to providing equitable access to learning opportunities for all students. If you have a disability and are seeking accommodations, please contact the Disability Resources at the Center for Student Success. All requests for accommodations must go through that office. You should also contact the instructor *at least* two weeks before the accommodations are needed.

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[*] blackboard.oberlin.edu

[†] www.gradescope.com

[‡] www.monroecc.edu/faculty/paulseeburger/calcnsf/CalcPlot3D

[§] www.wolframalpha.com/examples/Calculus.html

Liberal Education: An important part of any liberal education is learning to use abstract thinking and symbolic (mathematical) language to solve practical problems. Calculus is one of the pillars of modern mathematical thought and has diverse applications. In this course, students will be exposed to theoretical concepts at the heart of calculus and examples of real-world applications.

Scholastic Dishonesty: This includes: cheating on exams; taking or using past/present exam materials without instructor permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain grades dishonestly. *All students are expected to follow the Honor Code.* If it is determined that a student has cheated, they may be given a grade of F for the course and may face additional sanctions from Oberlin College.

Course Help: Studying mathematics can be difficult. Below is some helpful advice and information.

Reading: The relevant material should be read *before* lecture. If there are reading questions on that material, then do your best to complete them.

Homework: Begin it *immediately after* lecture, doing as much as you can *on your own* for the first few days that it is assigned. During this period, you should not be discussing solutions with others. Once you have completed all that you can, spend the last few days discussing the problems with one or more classmates to get further help. ***Do not search for homework solutions online.*** This creates a destuctive habit; it also violates the Oberlin Honor Code.

Free Tutoring: There are two options.

- *Zoom:* Meet on Zoom with Akira Di Sandro, the dedicated tutor for the course. Her schedule will be made available at the beginning of the semester.

- *Center for Student Success:* Their Tutor Program connects peer tutors to enrolled students who would like some study support or a learning partner. Every tutor has been recommended by a faculty member. For more information, contact:
  Donna Allen (Tutor Coordinator)
  Center for Student Success
  Peters Hall, Room 119
  tutor@oberlin.edu
  (440) 775-8464.