# Multivariable Calculus

## MATH 241-01, MTWF 9:00am - 9:50am, Swords 330, Spring 2020

### Professor Reginald McGee

**Contacting Me:** Office: Swords 326, e-mail: `rmcgee@holycross.edu`, phone: x2635
My pronouns are: He, Him, His
Website: `http://mathcs.holycross.edu/∼rmcgee/teaching.html`

**Student Hours:** Monday 10:30-11:30am, Monday 3:00-4:00pm, Tuesday 10:30-11:30am,
Tuesday 3:00-4:00pm, or by appointment.
Please send times you are available when requesting an appointment to expedite scheduling.

**Course materials:** *Calculus: Concepts and Contexts*, Fourth ed., by James Stewart. We will be using
the on-line homework package WebAssign. If you purchase a new text through the bookstore,
payment for WebAssign will be bundled with the text. If you purchase a used copy or an on-line
copy, you will have to purchase WebAssign online in the first two weeks of the course.

**WebAssign:** WebAssign is an on-line homework system. The problems are taken directly from the
text, but may be modified for on-line use. Among its features, it provides multiple tries at a
problem (the default is five), instant feedback about whether your answer is correct, links to
sections in the book relative to a concept or problem, and whiteboard explanations on how to do
a problem. WebAssign can be found on-line at `http://www.webassign.net/`. When you go to
this page, you will a button "I Have a Class Key" below the "Account Log In" panel. The class
key for our course is the eight digit code

<div align="center">

1332 9344

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For the institution, use `holycross` (that's all one word, lowercase). You will be able to use
WebAssign for two weeks without paying. If you purchased a new text, it should come with a
WebAssign code indicating that you have purchased it.

**Course Content:** Multivariable Calculus is a one semester course on the calculus of functions with
more than one dependent variable or more than one independent variable. The course will use the
language of vectors to study functions and express the concepts of differentiation and integration.
A primary theme of the course will be to make substantive connections between the mathematics
and its use in the sciences. We will also make use of the computer to investigate the mathematics
and its applications. While we will draw on the ideas of differentiation and integration of functions
of one variable, much, if not all, of this material will be new to you. We will cover material in
Chapters 9-13 of the text.

**Course Prerequisites:** MATH 134, 136, an equivalent college second semester calculus course, or a
score of 4 or 5 on the BC Advanced Placement Exam in Mathematics, or permission from the
department chair.

**Intended Audience:** This course is designed for students who are interested in mathematics beyond one variable calculus, including students who are considering a major in mathematics, the sciences, engineering, or economics. It is a required course for mathematics and physics majors.

**Class Format:** While most classes will be lectures, there will be informal activities in class and ample opportunity for interaction and involvement.

**Computing:** We generally will use the computer lab in Haberlin 136. We will be using the scientific computing software MATLAB (Matrix Laboratory). No prior familiarity with MATLAB is needed.

**Calculators:** Graphing calculators have become the de facto norm for high school and college mathematics and science courses. The use of calculators is allowed during in-class activities and homework, but are prohibited on quizzes and tests. Quizzes and tests will be written so that calculators are not required. Keep in mind that while it is useful to be fluent in the use of calculators, calculator fluency alone is not a substitute for understanding.

**Grading:** Your total course percentage will be computed as follows:

| | |
|---|---|
| Class Participation | 5 % |
| Written Homework | 10 % |
| Online Homework | 10 % |
| Weekly Quizzes | 12.5 % |
| Midterm Exams | 37.5 % |
| Final Exam | 25 % |
| | |
| Total | 100 % |

**Grading and assignment notes:**

(i) The aggregate WebAssign score, each written assignment, and exams will receive a numerical score which will contribute to the appropriate percentage. At the end of the semester, total course percentages will be used to determine final grades. I do not use an absolute scale to determine letter grades.

(ii) Written homework will usually be due on Wednesdays at the beginning of class. The lowest written homework will be dropped at the end of the semester. WebAssign assignments will usually be due Wednesday at 10pm or Saturday at 10pm during the week of an exam.

(iii) There are a total of 7 quizzes on the syllabus. The lowest 2 quiz grades will be dropped at the end of the semester for a total of 5 quizzes that count for credit. Quizzes cover material since the preceding quiz or hour exam.

(iv) Midterm exams will be 75 minutes. The first midterm covers material starting with the beginning of the course; the second midterm covers material starting with material covered since the first midterm exam; the third midterm covers material starting with material covered since the third midterm.

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|---|---|---|---|
| **Midterm 1** | **Wed.** | **February 19th** | **evening 6:45pm** |
| **Midterm 2** | **Wed.** | **March 25th** | **evening 6:45pm** |
| **Midterm 3** | **Tues.** | **April 21st** | **evening 6:45pm** |

(v) The final exam is a comprehensive exam scheduled during exam period.

**NOTE:** Any end of semester travel arrangements must be made for after the final exam period.

While you are allowed and encouraged to work on homework problems with your classmates, the solutions you turn in to be graded should be your own. Take care to write up solutions **in your own words**. Plagiarism will not be tolerated and will be treated as a violation of both the departmental policy on academic integrity and the college's policy on academic honesty.

**NOTE:** LATE homework will NOT be accepted nor are individual WebAssign extensions granted. I will drop your lowest written homework grade at the end of the semester.

**Academic Integrity:** The Department of Mathematics and Computer Science has drafted a policy on academic integrity to precisely state our expectations of both students and faculty with regards to cheating, plagiarism, academic honesty, etc. You are required to read this policy and sign a pledge agreeing to uphold it. A violation of the Departmental Policy on Academic Integrity will result in a 0 for that assignment (or exam) and a letter describing the occurrence of academic dishonesty will be sent to your Class Dean.

The College's Academic Integrity Policy can be found: `https://catalog.holycross.edu/node/1381#AHP`

**NOTE:** There will be a ritual before every exam where we all turn off our phones and places them inside our bags. If you have a potential emergency where you need to have your phone on discuss with me before the exam.

**Disability Statement:** Any student who feels the need for accommodation based on the impact of a disability should contact the Office of Disability Services to discuss support services available. Once the office receives documentation supporting the request for accommodation, the student would meet privately with Disability Services to discuss reasonable and appropriate accommodations. The office can be reached by calling 508-793-3693 or by visiting Hogan Campus Center 215A.

If you are already registered with Disability Services, please be sure to get your accommodation letters and deliver them to your instructors in a timely fashion. Instructors need 4-5 days advance notice to be able to facilitate the process of receiving testing accommodations.

**E-mail Policy:** I will only respond to class-related emails from your **"g.holycross.edu"** address. In the subject line of your email, you MUST include the name or number of the course so that I know to respond in an appropriate timeframe. Please begin with a salutation and also identify yourself in your email, and do not send attachments without first discussing it with me. It is sufficient to send the attachment in a separate email after describing it in a prior email. Emails that do not follow basic email etiquette may be ignored.

**Electronic delivery of written responses:** Any writing assignments this semester are to be turned in electronically via email from your **"g.holycross.edu"** address. The writing assignments should be **Portable Document Format (PDF)** and the filename for the PDF document should be: LASTNAME-FIRSTNAME-YEAR-COURSENAME-SECTION-EXAMNUMBER.pdf

These guidelines are in part to build good submission habits for when you need to send documents for jobs, interviews, internships, etc.

**Disclaimer:** The schedule listed on the course calendar is tentative, and topics covered on a given day may change slightly depending on the pace set for the course. The following may be changed, but only in the event of an emergency such as school closure: due dates for homework, dates for exams, and topics covered on each exam. If this occurs, it will be announced as soon as possible electronically and in class. I reserve the right to correct typographical errors on this syllabus without comment.

**Expectations:** You are expected to come to office hours prepared with specific questions. Office hours is NOT to do your homework.

High school mathematics versus collegiate mathematics:
"Jones is constantly testing a series of if this, then that propositions, writing proofs in his head, trying to find the most elegant answer at the bottom of a series of self-contradictory explanations. I view things pretty coldly and rationally, says Jones. Everything I hear is a cost-benefit analysis to a degree. There was one college course that changed everything for him. It was a theoretical math course, and it was designed to help incoming students let go of their high school notions of math: plug and chug, memorizing and executing steps without really understanding the concepts beneath them. He became fascinated with the art of simplicity, and the elegance and efficacy of reducing things to their simplest form."
Eve L. Ewing, "Bomani Jones Has a Funny Joke for You", GQ May 15, 2018

Become comfortable wrestling with concepts from the course:

**HOW TO STUDY MATH**
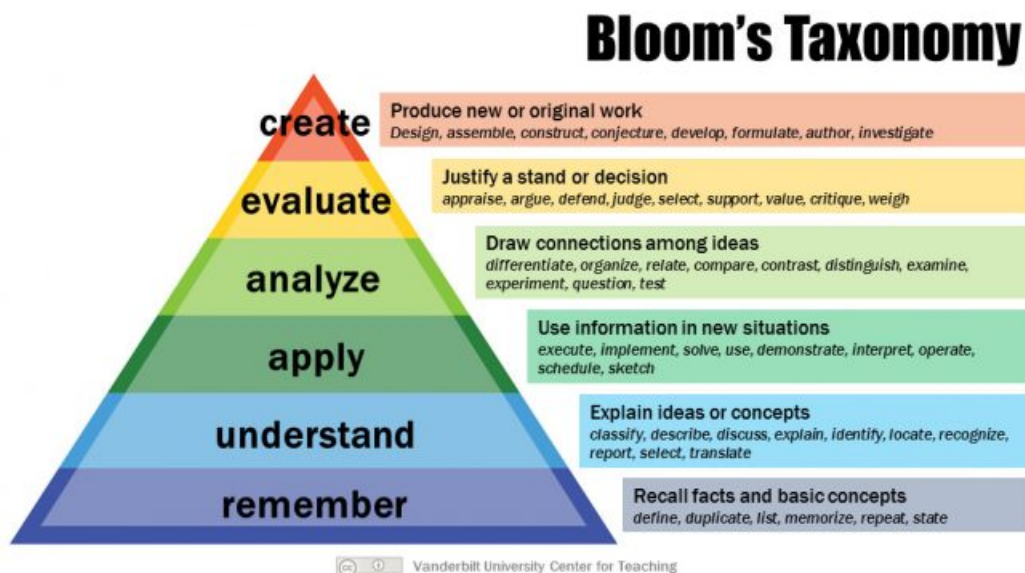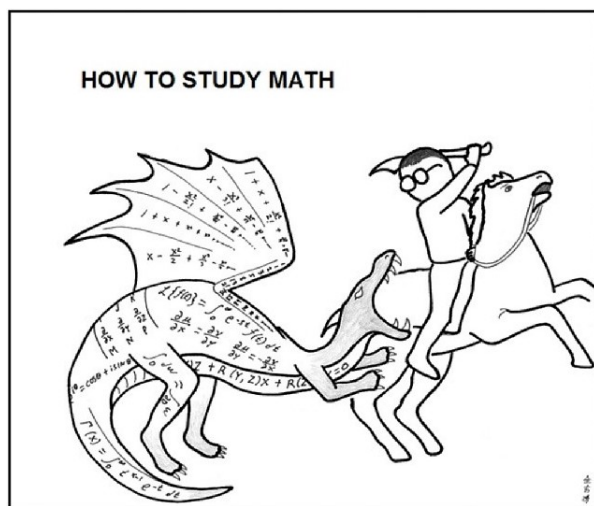
**Don't just read it; fight it!**
--- Paul R. Halmos

**How to do well in this course**:

- Good time management skills are essential in a college math course.
- The best way to learn math is by doing it.
- Do a little work each day.
- Read and work through the textbook and previous notes in preparation for class.
- Attend class, participate, and ask questions.
- Go over your lecture notes as soon after class as possible.
- Start working on homework as soon as it is assigned.
- Do your homework regularly.
- Work with your classmates. Organize study groups.
- If necessary, do more problems than are assigned, especially if you feel uncomfortable about how you understand the material.
- Find out how to do every homework problem.
- Material which is studied today will be used tomorrow.
- Seek help when you do not understand something!

**When studying for exams cycle through the material SEVERAL times**:

- Go through class notes
- Go through written and online homework
- Go through quizzes
- Go through the textbook