

# Math 38 (Calculus II)

**Instructor:** Dr. Ellen Veomett

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**Phone:** 925-631-8302

**Office Hours:** by appointment (zoom)

**Text:** *Apex Calculus* (version 4.0 ) <http://www.apexcalculus.com/downloads>

Precalculus: An Investigation of Functions (2nd edition) by Lipman and Rasmussen  
<http://www.opentextbookstore.com/precalc/>

**Prerequisites:** Math 13 (with a grade of C- or better)

**Course Web Site:** Moodle page: go to *my.stmarys-ca.edu*, log in, and click on “Gael-Learn (Moodle)”

This site will have course handouts available for downloading. It will be updated with other information as the semester progresses.

**Goals of Course:** By the end of the course, you will be able to

- Clearly and correctly express the basic ideas and results of trigonometry, differentiation and integration orally and in writing.
- Calculate derivatives of elementary functions easily, understanding the interaction between the various derivative rules.
- Discuss and solve a variety of problems involving the concept of rate of change of one variable with respect to another, both in mathematics and in related disciplines, such as physics, engineering, biology, and economics.
- Connect the concepts of area of a planar figure with that of antiderivatives
- Calculate integrals of elementary functions using substitution and integration by parts.
- Appreciate, understand, and apply the Fundamental Theorems of Calculus.
- Explain all of these new concepts and applications clearly, logically, and with the appropriate mathematical language.

**Expectations:**

- Every person in this class will treat every other person in this class with respect.

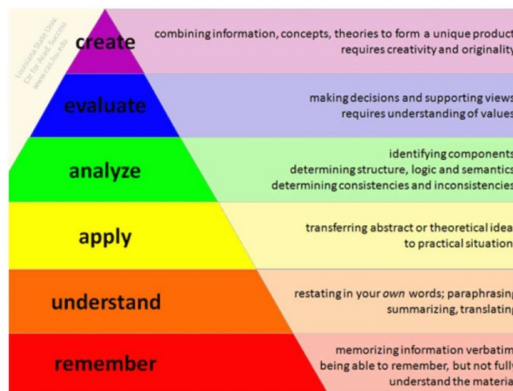
- Every person in this class will watch the associated videos and submit any corresponding questions before the following class period.
- I expect the team homework to be completed in the manner described in the handout.
- We will all arrive to class on time, ready to learn and share ideas.
- I expect each person in this class to check their e-mail regularly.

**Grading Policy:** The following components will go into your final grade:

Participation	5%
Written Team Homework*	19%
WebWork Homework*	19%
Exam 1*	19%
Exam 2*	19%
Exam 3*	19%
Oral Online Final Exam*	19%
Gateway Exam	n/a

\*Note: the item marked with an\* that is the lowest score will be dropped from the final score *unless* we do 2 or 3 of our exams remotely. **In that case, the Oral online final exam will be required**, and the lowest score from among the remaining scores marked with an\* will be the dropped score.

Participation: The structure of this course is called a FLIPPED class. In a typical class, students learn the basic material through in-class lectures. They then do the hard work of applying that knowledge creatively to homework problems outside of class. In this class, those two are flipped: you will watch lectures out of class to learn the basics, and during class we will do the hard work of applying that knowledge creatively.



I've chosen to implement this course as a flipped class for two reasons: 1) I've found it works particularly well when the class is partly or entirely remote, and 2) flipped classes have been shown to improve retention and grades for all students, in particular for students underrepresented in the STEM fields:

<https://www.pnas.org/content/117/12/6476>

There will be 1-3 short (10-15 minute) videos that you will watch before class each day. While you watch the video, you must TAKE NOTES, pausing and rewinding

as desired/needed. You will also make note of any questions that you have based on the video or the prior lecture's WebWork homework.

At the beginning of each class day, we will:

1. Address any questions from the prior class's WebWork (which is due at 11:59PM the day we meet).
2. Address any questions from the current class's videos.
3. Work together on the current class's WebWork problems, which are due at 11:59PM the *following* class period.

Your in-class participation grade will be a reflection of how engaged you were in grappling with and working on that day's material. Your participation grade will be good if you:

- Watch the videos and come prepared with questions and prepared to work on that day's WebWork material.
- Respond in an engaged manner to the 5 journal entries interspersed throughout the semester.
- Attempt to help other students when you understand the material.
- Arrive to class on time, and miss no more than 3 classes during the semester (exceptions will, of course, be made for emergencies or prolonged illness).

Exams We will have three tests throughout the semester. These will take place on Monday Sept 21, Monday Oct 19, and Monday Nov 16. The tests will be taken in class *without the use of notes and without the use of a calculator*.

WebWork Homeworks: During *every* class period where new material is covered, you will find a new homework available on the Math 14 WebWork webpage:

<http://54.225.94.216/webwork2/Math-014-01-F2020/>

We will spend the bulk of our class time working on these homeworks together. **Any problems that you are unable to finish during the class period, you should finish on your own outside of class.** If you have any remaining questions, you may bring them to the following class period and they will be due at 11:59PM that day. For each problem, you will have an unlimited number of tries to submit a correct answer (up until the due date). There is a document describing how to log in to WebWork on the moodle website.

I recommend that you print out each WebWork homework (using "Download PDF or TeX Hardcopy for Current Set") and keep your scratch work in a notebook dedicated to homework for Math 14. That way, you can easily see your work in

case your answer is incorrect and you would like to correct it, and you can also refer to those notes when you're studying for exams.

Written Team Homeworks: You will have written mathematical homework that is handed in once a week, except for exam weeks. **You will find the written homework assignments on the moodle website.** You will work on this homework in small groups (about 3 students) which will be assigned to you and changed every 2-3 weeks. Each group will hand in one homework solution for the whole group, and it is imperative that each member understand all solutions in their group's homework.

The written mathematical homework is your chance to practice explaining mathematics. **For each problem on the written homework, you should explain the question, how you got your answer, and you should interpret your results.** Thus, your solution will frequently use full sentences. If diagrams, graphs, or charts help in making your answer more clear, use those as well. If you have any questions as to what is an appropriate written solution, please talk to me.

These written homeworks will be of special importance for this class, as **every question given during the oral final exam will be one of these written homework questions.** Thus, you should take advantage of your group members to make sure you fully understand each problem in the team homework so that you can ace the final exam!

Gateway: Being able to differentiate is a fundamental requirement of this course. The Gateway exam allows us to ensure that anyone passing the class can differentiate basic functions, while also giving us the freedom to test *applications* of the derivative on the midterm exams.

Each gateway exam has 10 problems. A passing grade on the Gateway is an 8/10 or better score. Gateway exam testing will take place in the STEM Center (Assumption 200). Starting around 1/3 of the way through the semester, you will be allowed to take the Gateway exam up to once a day (Sunday-Friday) in the STEM Center, during STEM Center hours. If you pass the gateway in the first two weeks it is available, you will get 5 extra credit points on your final exam. In the third week: 4 points, fourth week: 3 points, fifth week: 2 points, sixth week 4: 1 point. If you do not pass the gateway, you will not be able to earn a grade better than a D+. There will be practice gateway exams available to you; stay tuned for more details on the practice exams.

**Late Work Policy:** Written Homework will be turned in at the beginning of class on the day that it is due. I will not accept late Written Homework, and I will not accept late WebWork homework. I will drop the lowest written homework score, which should cover the rare unexpected absence that prevents your group from handing in the homework on time. But keep in mind, you will still be responsible for those problems on the final exam.

If an emergency arises and you are unable to attend an exam, I expect to be notified by email or phone call *as soon as possible*. Most likely, the missed exam will be your dropped exam.

Final Exam: The final exam will be an oral exam, given during the final exam week (the week after Thanksgiving). Each student will have a 15 minute zoom meeting with me, during which they will answer 3 questions that will all be taken directly from the written homework questions (which is about 30 questions in total). The student may select the first question that they answer, and I will select the following two questions. I will give a grading rubric for this exam later in the semester. This kind of exam is more easily administrated in a remote setting than a written exam, and it has been shown to improve retention, grades, and understanding:

<https://www.tandfonline.com/doi/abs/10.1080/10511970902869176>

**Technology:** You may use a graphing calculator on your homework to **check your answers** and to give you a graphical perspective on what are often algebraic problems. You will also be introduced to Wolfram Alpha and Geogebra, which are free computer resources for mathematics. This may save you the expense of buying a calculator. In either case, you must (and it is your responsibility!) to make sure the technology you are using is enhancing your understanding of the material, rather than being used as an alternative to understanding. Remember that you are not going to be allowed technology on exams, and you are ultimately be responsible for utilizing technology appropriately.

### Covid Specific Details

It is of the utmost importance that you *not come to class sick*. I am happy to work with you if you have a prolonged illness; talk to me if this is an issue.

Students must have:

- Internet Connection
- Access to Moodle
- Access to Zoom. In addition to the internet connection listed above, this includes:
  - Speakers and a microphone
  - One of the following supported operating systems:
    - \* Mac OS X with MacOS 10.6.8/(Snow Leopard) or later
    - \* iOS 7.0 or later
    - \* Windows 7, 8, 8.1, or 10
    - \* Android 4.0x or later
- Webcam or HD webcam

I will not require that you have a tablet (such as an iPad, computer tablet, Wacom tablet, etc) but it will be very helpful to have one.

Grading Adjustments: If we switch between hybrid and remote learning in the semester, the switch should be fairly seamless. The activities will largely not change. The only potential change is to the grading policy, if 2 or more of our exams is conducted remotely (please see the **Grading Policy** section for details).

**STEM Center:** Saint Mary's has a new STEM Center on the second floor of Assumption Hall for students studying Science, Technology, Engineering, and Mathematics. The STEM Center will provide several useful services, including:

- Math, Chemistry, Physics, and Biology tutoring, both in-person and online: Monday-Thursday 12-9 PM; Sunday 6-9 PM
- "Pathways to Science" speaker series featuring world-class scientists
- Social events with free food
- Study space and computer workstations

If you have any questions, please contact Dr. Natacha Cesar-Davis (CALC Program Director) at [nmc15@stmarys-ca.edu](mailto:nmc15@stmarys-ca.edu).

**Student Disability Services:** The College strives to make all learning experiences as accessible as possible. Students who anticipate or experience academic barriers based on a disability are encouraged to contact Student Disability Services (SDS), a department of the Student Success Office, to set up a confidential appointment to discuss available services and options. The Student Disability Services office can be reached by emailing [sds@stmarys-ca.edu](mailto:sds@stmarys-ca.edu); calling 925-631-4358; or visiting the office located in Filippi Academic Hall FAH190. The SDS website can be found at <https://www.stmarys-ca.edu/student-disability-services>



**Honor Code:** Saint Mary's College expects every member of its community to abide by the Academic Honor Code. According to the Code, "Academic dishonesty is a

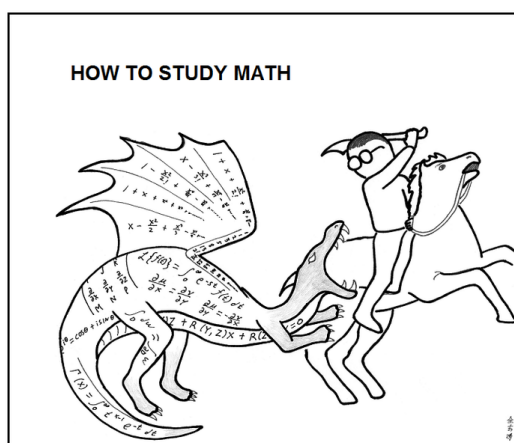
serious violation of College policy because, among other things, it undermines the bonds of trust and honesty between members of the community.” Violations of the Code include but are not limited to acts of plagiarism. For more information, please consult the Student Handbook at [www.stmarys-ca.edu/your-safety-resources/student-handbook](http://www.stmarys-ca.edu/your-safety-resources/student-handbook). If a reasonable suspicion arises that you have violated academic honor code, you will be referred to the Academic Honor Council for further review and or necessary sanctions.

## Some Additional Thoughts and Suggestions

- Sleep, planning, and time management are super important. But don't take my word for it! Check out this [blog post](#) by an undergraduate student athlete (you can click on the link if you're reading this in a pdf reader)

<https://preview.tinyurl.com/y2ya2k7f>

- I strongly recommend that you have two notebooks: one for taking notes in class, and one for keeping all your scratch work for the WebWork homework and the written homework. If that doesn't sound right to you, use whatever notebook method works for you; just make sure it is indeed working for you!
- The written homework solutions that you hand in should be clear, concise, and polished solutions. There should be enough explanation so that another Calculus student (perhaps not in our class) can read your solution and understand both what the question is and how you got your answer. In order to write these beautiful solutions, you'll need to do scratch work first. Don't be afraid of scratch work! *Anything* that you write while thinking about a problem will probably help you in the end. *Save your scratch work*, and it will help you in studying for exams later.
- College classes require about 2-3 hours of outside-of-class work for every 1 hour in class. Thus, since our class meets approximately 3 hours per week, you should plan to spend about 9 hours outside of class working on the online homework, written homework, reviewing notes, reading the book, studying for exams, etc. But just because you're studying 9 hours per week doesn't mean you understand the material. Which brings us to our next point:



**Don't just read it; fight it!**

--- Paul R. Halmos

- Studying is all about efficiency; **using your time optimally** in order to learn the material as completely as possible. To do this, you will need to know what you



don't know. Once you understand which parts of the material you do and don't know, you will need to focus on what you don't know until you eventually know it.

This means spending a lot of time with material that you don't know, which can feel uncomfortable. This is the secret to studying mathematics: *becoming more comfortable with being uncomfortable*. We need to spend time on topics we don't yet understand in order to understand them.

- In recent years, I have found that students need to focus on increasing what I call their *mathematical stamina*: the amount of time they can work in a productive and focused way on solving mathematical problems. I encourage you to put aside all distractions for at least 45-75 minutes in a row at least 3-5 times a week and focus only on mathematical work. This will help increase your mathematical stamina. Having good mathematical stamina is key for performance on exams.
- I highly encourage you to talk with your peers and with me about mathematics. It can be fun, invigorating, and useful to discuss mathematics from different vantage points. But don't let someone's beautiful explanation of a homework problem trick you into thinking that you know how to do that problem. Until you can come up with that beautiful explanation on your own, you don't yet know it and thus must continue to learn that topic.

There is a clear line between working with other students and exchanging information in an academically dishonest way. It's totally fine to talk with other students, to write while you're talking with those students, to listen to their responses, etc. It is academically dishonest to exchange written solutions or post written solutions. Similarly, it is academically dishonest to look for solutions online.

- Remember that part of your training in college is learning to be a professional so that you can be successful when you graduate. This includes interacting with your peers and professors in a professional manner, taking appropriate responsibility for your work, and asking for appropriate help when needed.

For example, professionals must be punctual, prepared, and engaged. Professionals are aware of and plan for their responsibilities so that if several deadlines occur at the same time, they can successfully complete all of them. Professionals are courteous and respectful of others' time.

- Technology can be an extremely useful tool. It can help you to gain an intuition for the material, it can help you to check your work, and it can make the material more fun. But again, don't let technology trick you into thinking you understand something that you don't. It's your responsibility to use technology as a tool to help you gain understanding and not as a crutch to aid you in avoiding understanding.
- I love to talk math, and in general I love to talk! Please come to see me if you'd like to chat!