MATH 1320-100   CALCULUS II   SPRING 2020

Course basics

Instructor: Bogdan Krstić
Office: Kerchof 121
Office hours: MoWeTh 1-2 PM, and by appointment (at least a day ahead of time).
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Classroom: New Cabell 368
Meeting time: MoWe 3:30-4:45 PM, Th 5-5:50 PM
CRN: 12195
Credits: 4

Prerequisites

Math 1310 or AP Calculus credit (level AB). This material is covered in Chapters 1-6 of our text (which you should review as needed).

Course description

Math 1320 is a second calculus course intended for students interested primarily in the natural sciences but is open to all students. Because this is a second course in calculus, you already know that calculus provides two fundamental tools for analyzing functions: the derivative and the definite integral. In this course, you will learn additional techniques for computing integrals as well as additional applications of integrals. You will be introduced to mathematical modeling with differential equations, learning two integration-based techniques for solving such equation as well as one technique for finding approximate solutions. You will learn new ways of describing curves in the plane and will apply the tools of calculus to analyze these curves. You will study how to define as well as to represent functions by power series.

Course design

All sections of Math 1320 are based on active- and cooperative-learning strategies designed to further develop your problem-solving skills applicable in any situation.

During our Monday and Wednesday class meetings, at least 70% of the time you will be engaged in groupwork with your classmates. The rest of the time will be devoted to mini-lectures (by me), problem-solution discussions (led by students), and whole-class discussions of concepts, techniques and problem-solving principles. During our final class meetings on Thursdays, we will review topics from the first two class meetings of the week and typically have a quiz on those topics. For our Monday and Wednesday class meetings, you'll be expected to familiarize yourself, through online video class-prep assigments with the basic notions and ideas that will play a role in class.

The design of this course is based on research showing that students learn best when they take an active role, when they discuss what they are reading, when they practice what they are learning, and when they apply practices and ideas. Our assessments of the effectiveness of this format are consistent with these findings. For example in Fall 2017 and 2018, students in active-learning sections of Math 1310, on average, achieved normalized gains on the "Calculus Concept Inventory" 11% and 20% higher, respectively, than those of students in traditionally taught sections and in 2017 scored between 5.9% and 38.2% higher on multiple choice assessment problems on the common Math 1310 final exam. We expect similar gains in Math 1320.

Course objectives

Upon successful completion of this course, students will be able to:

- Explain the Big Idea of Accumulation in terms of the definite integral, series and power series.
- Acquire the skills to calculate definite integrals, determine convergence (or radius of convergence) for series and power series, and to create Taylor series.
- Be able to apply the ideas of accumulation to calculate areas, volumes and lengths.
- Be able to apply and combine ideas of accumulation in new contexts not specifically covered in the text.

Placement

Is this the right calculus class for you? Read the Mathematics Department's Placement Information.

Course text

The course text is *Single Variable Calculus: Early Transcendentals*, 8th edition, by James Stewart (Publisher: Brooks/Cole Cengage Learning). An electronic edition of the text is provided through the online homework system WebAssign, to which you must have access (acquisition of a physical copy of the text is optional). Any student who purchased WebAssign for Math 1310 at UVA may already have WebAssign access for this course via the same code used for Math 1310. Try your code!

If you must purchase WebAssign for Math 1320, you have several options:

(1) purchase WebAssign single-term access online through the WebAssign website,
(2) purchase a single-term WebAssign-access card at the UVA Bookstore,
(3) purchase a physical copy of the text, bundled with a multi-term WebAssign-access card, at the UVA Bookstore, or
(4) purchase WebAssign via (1) or (2) and, if you want a hard-copy of the text, buy a used copy.
(5) purchase Cengage Unlimited. A "Cengage Unlimited" subscription gives students 1 semester access to all Cengage products for $119.99. For a Calculus II student who uses Cengage materials for another course, Cengage Unlimited would be the best WebAssign purchase option.

There is a two week grace period at the beginning of the term during which you have free WebAssign access to the text as well as course homework sets. Go to webassign.net/uva/login.html and enter our class key: **virginia 3608 9700**.

Assessments

Homework. You wil be completing both online homework and written homework. Online homework will be delivered through WebAssign (webassign.net/uva/login.html).

WebAssign. There will be two forms of online homework. Before each Monday/Wednesday class meeting, you are expected to complete a class-prep assignment on WebAssign; these will be due at 5 AM on the day of class. You will also have regular online homework covering the course material.

Written homework. Calculus cannot be learned solely through typing answers into a WebAssign box. To that end, you will be asked to turn in written solutions to an offline homework assignment approximately every two weeks. This will be my primary tool for evaluating your ability to write a complete solution to a mathematical problem. Keep in mind that on quizzes, and when you sit for the midterm and final exams, your entire solution will be evaluated, not just the answer.

I strongly encourage you to work in groups on written homework assignments. If you choose to work in a group, you still must write up your own final solutions. All sections of Math 1320 will have common written homework.

Extensions and late work. If you contact me at least 24 hours (exceptional circumstances aside) before a WebAssign assignment is due, you may obtain an extension without any penalty. You may also obtain automatic extensions via WebAssign on your homework if the above 24 hour deadline has passed; you will receive a 25% penalty on problems you have not completed before the usual homework deadline, and you will have 48 hours after the time the assignment is due to obtain such an extension. Prior arrangements aside, late written homework will not be accepted.

Quizzes. A short quiz (10–20 minutes) will be given at the start of every discussion section on Friday (except the first one). Each quiz will consist of two to three problems that will help you to assess whether you learned the basic concepts and problem-solving techniques treated earlier in the week. In computing your final quiz average, I'll drop your lowest quiz score.

In-class work. During the Monday and Wednesday meetings, you will be completing classwork assignments collaboratively, in a small group of fellow students. I will collect one packet from each group approximately every week, to be graded. The Thursday quizzes will directly incorporate problems from classwork assignments earlier in the week, so it is to your advantage to complete as many of the problems as you can either in or out of class.

Piazza. It is likely that you will have questions as you read the text, view class-prep videos and complete homework assignments. Those that occur to you will likely also occur to other students. You should raise these questions at our class's Piazza Q&A site, accessed through Collab. Before every exam, you can earn up to 5 points (or half a quiz) for 5 substantive posts on Piazza. These can be questions posed to the class, answers to others' questions, etc.

Reflections. During the first two class meetings of each week, you will be exploring new course topics through collaborative problem solving with your classmates. During the final class meeting of the week, we'll be revisiting topics, concepts, and problem-solving techniques that students believe require further discussion. You can identify what course material needs to be revisited through weekly submissions of course-related reflections. For each thoughtful reflection-statement you submit, you will earn one point towards your classwork and quiz grade.

Exams. There will be two evening midterm exams given during the semester. The exams are common to all sections of Math 1320. The dates of these exams are as follows:

- **Midterm Exam 1:** Wednesday, February 19th, 7-8:30 PM
- **Midterm Exam 2:** Wednesday, April 8th, 7-8:30 PM

For those students who have a time conflict with another course, a make-up exam will be given the following morning beginning at 7:20 AM. If you have a direct conflict with either of the above listed exam times, please notify me as soon as possible AND at least one week before the exam date. If proper notice cannot be given, then a request for the make-up exam will be honored only in cases of extreme emergencies and at the discretion of the course coordinator. Midterm and final exams will be graded in common, with all Math 1320 instructors participating.

The **final exam** will be held during the time specified by the university, which this semester is Friday, May 1st, 7:00-10:00 PM. It is University policy that finals may not be taken early. Conflicts with travel schedules will not be considered a valid excuse to miss the exam. All sections of Math 1320 take the common final examination at the same time. The final exam is comprehensive.

Course grade

The course grade will be determined as follows:

WebAssign/written homework	10 points
Classwork/class-prep/quizzes	10 points
Midterm 1	25 points
Midterm 2	25 points
Final exam	30 points
Total	100 points

The grading scale for the course is:

Grade	Percentage
A+	[98,100]
A	[93, 98)
A-	[90, 93)
B+	[87, 90)
B	[83, 87)
B-	[80, 83)
C+	[77, 80)
C	[73, 77)
C-	[70, 73)
D	[60, 70)
F	[0, 60)

In borderline cases, your letter grade may be higher — the one assigned to the interval immediately above the one your point total lies in.

Office hours

In addition to my office hours (Mondays, Wednesdays and Thursdays 1-2 PM), you are also welcome to come to office hours of the other 1320 instructors at the following days and times:

Instructor	Office	Day	Time
Christopher Chung	Kerchof 110	Mo	2-3 PM
Evangelos Dimou	Kerchof 224	We	2-3 PM
Matthew Gagne	Kerchof 126	Tu	11-12 AM

Policies

Attendance and classroom etiquette. Regular attendance is expected, as is class participation. Please arrive on time, turn off your cell phone, and stay for the entire class period. Unless otherwise instructed, you may not use any electronic devices during class. Studies suggest that student multi-tasking during class through use of smart phones and laptops hinders classroom learning for both users and nearby peers. Fourth hour attendance is mandatory and will be counted as part of the quiz average grade (see "Quizzes").

During the Monday and Wednesday class meetings of this course at least 70% of the time you will be engaged in groupwork with your classmates. You are expected to contribute to making the atmosphere in this class "friendly". Freely share your ideas with members of your group and be encouraging and supportive as they are sharing theirs.

Making unsuccessful attempts at solving problems is a natural part of the problem-solving process and ideas applied in unsuccessful work can often contribute to the discovery of a solution. Thus, when a "solution" presented within your group or to the class of as whole turns out to be flawed, it is a learning experience for everyone that should be valued not belittled.

Learning needs. UVA is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any barriers to learning in this course, please feel welcome to discuss your concerns with me. If you have a disability, or think you may have a disability, you may also contact the Student Disability Access Center (SDAC), to request an official accommodation. You can find more information about SDAC, including how to apply online, through their website at https://studenthealth.virginia.edu/sdac. If you have already been approved for accommodations through SDAC, please make sure to send me your accommodation letter and meet with me so we can develop an implementation plan. Accommodations for test-taking (e.g., extended time) should be arranged at least 5 business days before an exam.

Calculators. Calculators will not be allowed on the quizzes, midterms, or finals.

Exam grading concerns. After receiving a graded exam, you have 1 week (7 days) to raise concerns about grading errors.

Honor Code. The Honor Code will be strictly observed in this class. [1]

Tips for success

- Use class time wisely: fully engage yourself in class activities, asking and answering questions when appropriate.
- Seek understanding rather than trying to rely on memorized formulas.
- Take advantage of my office hours as well as the Mathematics Tutoring Center, which offers free tutoring to calculus students.
- It is nearly impossible to understand mathematics without working problems yourself. Thus, devoting sufficient time and attention to homework assignments is crucial to success in this course.
- Before beginning work on a homework-problem set assigned for a given section of the text, think about material discussed in class pertaining to the section — make sure you know and understand the definitions, theorems, concepts and problem-solving principles emphasized in class. Try to work problems without looking at your notes or the exposition in the text. When you work homework problems without relying on notes, you are reinforcing your understanding of the principles you reviewed just before beginning work on the problem set. Also, when you take this approach each homework assignment becomes a practice test.

Important dates (College of Arts & Sciences)

- Classes start: Monday, January 13
- Add deadline: Monday, January 27
- Drop deadline: Tuesday, January 28
- Midterm 1: Wednesday, February 19, 7-8:30 PM
- Withdrawal deadline: Monday, March 16
- Midterm 2: Wednesday, April 8, 7-8:30 PM
- Last day of classes: Tuesday, April 28
- Final exam: Friday, May 1, 7-10 PM

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[1]Recent honor violations committed by calculus students include: falsifying a doctor's note in order to postpone a scheduled exam, presenting a false excuse for postponing an exam as well as seeking to boost an exam score by correcting mistakes on a graded, returned exam and then reporting "grading errors" on the exam. Note that calculus instructors scan graded exams. Please remember to pledge each quiz and exam.