MATH 1220: Applied Calculus II

CRN: 10782 Credits: 3 Spring 2017

Course basics

Instructor Bogdan Krstić

Office Kerchof 402

Office hours Wednesdays 1 - 1:50 PM, Thursdays 12 - 1:55 PM, and by appointment (at least a day ahead of time)

Email bk2fh@virginia.edu

Classroom Monroe Hall 111

Meeting Time Mondays and Wednesdays, 2:00 - 3:15 PM

Textbook Soo T. Tan: *Applied Calculus for the Managerial, Life, and Social Sciences, 9th ed.*

Course Website Available on UVaCollab

Exam Dates Midterm 1: Feb 23, Midterm 2: Apr 12, Final Exam: May 8

Course description

Math 1220 is a second calculus course for business, biology, and social-science students. Math 1220 is a coordinated course. This means that all sections cover the same material and take the same tests.

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'll be using calculus to analyze trigonometric functions, probability density functions, functions depending on two variables, and functions defined by power series. You will also be introduced to mathematical modeling with differential equations, learning two techniques for solving such equations.

Course content

We will cover the following topics from the course text:

- Chapter 12: Trigonometry
- Chapter 6: Integration (Sections 6.5 and 6.6)
- Chapter 7: Additional topics in integration (Sections 7.1, 7.4, and 7.5)
- Chapter 8: Calculus of several variables (omitting Sections 8.5 and 8.6)
- Chapter 9: Differential equations
- Chapter 10: Probability and calculus
- Chapter 11: Taylor polynomials and infinite series (omitting Section 11.7 and discussion of Taylor remainder)

Learning outcomes

Upon successful completion of this course, students will

- be able to compute and to estimate values of the sine and cosine functions using their definitions and be able to apply the tools of calculus to analyze trigonometric functions;
- be able to set up integral formulas to solve applied problems;
- be able to analyze functions of two variables through their graphs, which are typically surfaces in three-dimensional space, as well as through partial derivatives and double integrals;
- be able to solve separable first-order differential equations exactly and be able to find approximate solutions to initial-value problems for first-order equations via Euler's method;
- know how to use the probability-density function for a continuous random variable X to compute associated probabilities as well as the expected value, variance, and standard deviation of X;
- develop intuition concerning when a series of real numbers converges and be able to confirm or correct that intuition by applying an appropriate test for convergence/divergence;
- be able to use power series to define new functions as well as represent famous "old" functions such as $f(x) = e^x$, $f(x) = \sin(x)$ and $f(x) = \cos(x)$;
- have further developed their problem-solving skills and strategies through modeling and solving a wide variety of problems, including some with real-world applications;
- be able to communicate mathematics with clarity and precision.

Course placement

Are you in the correct calculus course? Read the Mathematics Department's placement information at http://www.math.virginia.edu/content/math-placement.

Course text

Applied Calculus for the Managerial, Life, and Social Sciences, 9th ed. by Soo T. Tan. An electronic edition of the text is provided through the online homework system WebAssign, to which you must purchase access. Acquisition of a physical copy of the text is optional. *Any student who purchased WebAssign for Math 1210 at UVA may already have WebAssign access for this course via the same code used for Math 1210. Try your code!* If you must purchase WebAssign for Math 1220, you have a number of different purchase options:

- There is a two-week "grace period" at the beginning of the term during which you

  have free WebAssign access to the text and course homework sets — go to `http://www.webassign.net/uva/login.html`, and via the gray button on the upper right, enter our class key **virginia 9105 8069**.
- The least-cost option is to only purchase access WebAssign (which includes the Tan e-book). You may do this directly through WebAssign (after establishing your account during the grace period you will be presented with a purchase option when you log in), or you may purchase a WebAssign plus e-book access card from the UVA Bookstore.
- If you want a physical copy of the text, the least-cost option is to purchase a used copy of the text from the Bookstore while obtaining WebAssign directly through your WebAssign account. If you want a new, loose-leaf physical copy of Tan's book, you may acquire the loose-leaf text plus WebAssign bundle from the UVA Bookstore.

Diagnostic quiz

During the course meeting on Monday, January 30, there will be a short quiz (15-20 minutes) consisting of problems designed to test basic calculus and algebra skills. The diagnostic quiz is intended to indicate your preparedness for the course; a grade over 80% is expected.

Homework

Homework will be assigned in two forms: there will be regular problem sets posted on WebAssign, to be completed electronically, and there will also be (roughly weekly) written homework.

As calculators will not be allowed on the quizzes and exams, it is highly suggested that you attempt to do all the homework problems with minimal aid from your calculator.

Online (WebAssign) homework

Completing a WebAssign assignment at least 24 hours before the due date is worth 10% extra credit on the assignment (you may not obtain a grade higher than 100% on the WebAssign component of your final course grade, however).

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.

Written homework

To receive credit for your written homework you must write legibly, staple all your papers together, show all work necessary to solve each problem, and indicate your answers. Answers with no work shown will earn no credit. Written homework will be graded on completeness (making a genuine attempt to solve each problem and showing all work) and correctness (randomly selected problems will be graded in detail).

Written homework is due at the beginning of class, unless I state a specific time and date for the assignment to be turned in, in which case I will also state the location (most likely my mailbox in Kerchof Hall). Prior arrangements aside, late homework will not be accepted. There is a seven day deadline (after the written homework is returned) to contest the grading of any questions on the assignment.

Discussions/Group work

Towards the end of the term, we will dedicate about three class sections to group work instead of lectures. This work will be collected (more details later), and graded by group. The grades will be counted towards the same category as the written homework, and the comments from the preceding section apply.

Exams

All exams will be calculator-free.

Midterm exams

The two midterm exams will be the evenings of Thursday, February 23 and Wednesday, April 12, from 7:00 PM to 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 my discretion. Midterm and final exams will be graded in common, with all MATH 1220 instructors

participating. *Note that there is a seven day deadline (after the midterms are returned) to contest the grading of problems on the midterm. Please contact me if you have any issues.*

Final exam

The final exam will be given Monday, May 8, from 7:00 PM to 10:00 PM. This is the time reserved for the Math 1220 final exam by the University and all sections of Math 1220 take the common final examination at the same time. It is University policy that final exams may not be taken early. The final exam is comprehensive.

Course grade

The course grade will be determined as follows:

Diagnostic quiz	5%
WebAssign homework	10%
Written homework/Worksheets	10%
Midterm 1	20%
Midterm 2	25%
Final exam	30%

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)

Learning needs

All students with special needs requiring accommodations should present the appropriate paperwork from the Student Disability Access Center (SDAC). It is the student's responsibility to present this paperwork in a timely fashion and follow up with the instructor about the accommodations being offered. Accommodations for test-taking (e.g., extended time) should be arranged at least 5 business days before an exam.

Learning environment

Regular attendance is expected, as is class participation. We must all work together to create an environment in which learning can take place. Please be respectful of others by coming to class on time, putting away your cell phone, and taking any conversations out of the classroom. *Unless otherwise instructed, you may not use any electronic devices in class.*

Tutoring and advising

Free assistance is available, starting January 24, at the Mathematics Tutoring Center (schedule at http://people.virginia.edu/~psb7p/MTCsch.html) in the Academic Commons at Gilmer Hall (Gilmer 290A); obtaining the services of a private tutor is allowed.

If you are in need of academic advice, walk-in advising is available in Monroe Hall Monday through Friday, from 2:30 to 4 PM.

Important dates (College of Arts & Sciences)

- Classes start: Wednesday, January 18
- Add deadline: Wednesday, February 1
- Drop deadline: Thursday, February 2
- Midterm 1: Thursday, February 23, 7-8:30 PM
- Withdrawal deadline: Wednesday, March 15
- Midterm 2: Wednesday, April 12, 7-8:30 PM
- Last day of classes: Tuesday, May 2
- Final exam: Monday, May 8, 7-10 PM

Academic integrity

Students are expected to be abide by the University Honor Code on all assignments and exams completed in the course.