

MATH122-B, Fall 2018: Calculus II

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Class Meetings MWF: 12PM-1PM in Trexler 263
Thursday: Lab, 8:30-10AM in Trexler 372

Office Hours By appointment only through <https://drmaggie.youcanbook.me/>:
Mon 9:00AM-10:00AM, 3:30PM-4:30PM Thurs 3:00PM-4:00PM
Tues 3:00PM-4:00PM Fri 3:30PM-4:00PM
Wed 9:00AM-10:00AM

NOTE: You can book up to 4 days in advance but have to book at least 2 hours before the time slot. Email me if none of these times work.

Course Objectives This course provides a continuation of the study of calculus. Topics to be studied include more applications of the definite integral, sequences and series and applications of them, and vectors and functions of one variable.

Intended Learning Outcomes By the end of this course, successful students will be able to:

- apply the theory of differentiation and integration to model and solve real-world problems.
- recognize a differential equation and be able to both solve basic differential equations and discuss what a differential equation tells you about the process it models.
- determine the behavior of infinite series and understand the role of power series and Taylor series in modern mathematics.
- utilize vectors in two-dimensional and higher-dimensional coordinate systems to model graphs and equations, and apply methods of Calculus to these graphs and equations.
- recognize the role of technology in Calculus, understand when it should be used, and be aware of its limitations.

Required Materials Textbook: *Calculus: Early Transcendental Functions*, by Smith and Minton, 4th Edition
Lab Technology: Laptop with Mathematica installed
Mathematica Free Download: see <https://webapps.roanoke.edu/www/it/mathematica/>
Calculator: A calculator with graphing capabilities
Prerequisite: MATH 121 (Calculus I) or the equivalent

Commitment Hours This course expects you to spend at least 12 hours of work each week inside and outside of class.

Course Grades The following table lists the weights for the various forms of assessment for this class.

Homework	25%	Tests	40%
Labs&Recitations	15%	Final Exam	20%

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below:

	B+	87-89	C+	77-79	D+	67-69		
A	93-100	B	83-86	C	73-76	D	63-66	F 0-59
A-	90-92	B-	80-82	C-	70-72	D-	60-62	

Reading Notebook

The key to learning a topic in mathematics is participation. We will strive to have an active, rather than passive, classroom environment. Near the end of the syllabus is a day-by-day outline of the sections that will be discussed in class. You are fully expected to have read the upcoming section before the class meeting! This does not mean you need to understand everything, but rather you should be familiar with the definitions and concepts from the sections. I will post questions on our Inquire page for each section of our textbook that we cover this semester. You will keep an online reading notebook (through Inquire) in which you will answer these questions and can include other notes about the reading material. I will check this notebook regularly, and this will count toward your homework grade.

Homework

A problem set will be due each Friday (excluding week 1) that we do not have a test. These will be assigned on the previous Friday and each are worth a total of 25 points. There are two parts to each problem set. The first part is worth 15 points and will be graded based on correctness and presentation. Each week you will complete 3 problems in this first part. Each of these problems is worth 5 points - 4 points are for correctness and 1 point is for presentation. The second part of each problem set is worth 10 points and will be graded based on effort and completeness. This part will consist of the three daily homework assignments for the previous three class periods. When you turn in your problem set on Friday, make sure the first part is on top (the problems graded for correctness) and the second part below. Your homework should be neat, organized, and stapled. No late homework will be accepted and solutions will be posted on the following Monday. For the first week, we will have a single problem, assigned below, due Friday, to get you accustomed to the grading. It will be worth 10 points. You can collaborate on problems sets, but you must **write up your own solution**. If you are looking at another person's work or asking someone what to do next while writing up your problem set, then you are in violation of the academic integrity policy of Roanoke College.

Quizzes

There may be written quizzes in this class. They may either be in-class quizzes or take-home quizzes. I may occasionally warn you about an upcoming quiz but you should be prepared to take a quiz on any given day, including lab days. These quizzes will always be extra-credit - any points earned will go toward your test grade.

Labs

We will meet in Trexler 372 every Thursday from 8:30AM - 10AM. This time will be spent working in groups on various problems. Some days will be Lab days, in which you will work on interesting applications of the calculus we are studying and use Mathematica to help you in this process. Other days will be recitation days, led by your student lab leaders, in which you will focus on working problems to help solidify concepts from class. Other Thursdays will be Test days, which will allow you more time than if we had test days during class time. Lab and recitation days are more informal and should be **noisy**. Ask questions of lab leaders and classmates!

**(1) Be on time! (2) Bring laptop, writing utensil, paper, textbook, notes.
(3) Learn Mathematica! (4) Think! (5) Work with others!**

Tests

Four tests will be given according to the schedule near the end of the syllabus. Each test will focus on the material learned since the last test, but as with most math classes, the exam will necessarily require you to understand and remember things from the past. Note that weather and other changes in the course schedule may affect the material covered on tests, but unless a test day is canceled due to weather, the tests will happen as scheduled.

Final Exam

The final exam will be comprehensive and given during the scheduled time for the **final exam for Block 9, i.e. Mon, Dec 10 from 8:30-11:30AM** in Trexler 263 OR the **final exam for Block 4, i.e. Fri, Dec 14 from 2:00-5:00PM** in Trexler 372. The best way to review for the final is to review your performance on the four tests; focus on material that you did not master the first time around, and review the topics that you did master.

Attendance & Make-Up Work

Attendance is critical to the understanding of the material in the course; it is both required and expected. Any absence that is not discussed with the instructor prior to the missed class is considered unexcused. Unexcused absences may result in the lowering of the final grade (for example, a B to a B-). When absent, excused or unexcused, you are responsible for all material covered in class. **You will not be allowed to make up any work missed due to an unexcused absence.** Should you miss a class or part of a class, email or talk to me as soon as possible to see if anything can be done to help you catch up. If you have **more than two unexcused absences**, you will be **dropped from the class after being sent a warning notice.**

MCSP Conversation Series

The Department of Mathematics, Computer Science and Physics offers a series of discussions that appeal to a broad range of interests related to these fields of study. These co-curricular sessions will engage the community to think about ongoing research, novel applications and other issues that face our discipline. Members of this class are invited to be involved with all of these meetings; however participation in **at least two** of these sessions is mandatory. After attending, students will submit a one page paper reflecting on the discussion **within a week of attending the talk.** This should **not** simply be a regurgitation of the content, but rather a personal contemplation of the experience. These reaction papers will be counted as homework and should be uploaded to Inquire using the appropriate link. If you leave the talk early or are disruptive during the talk, you will receive a 0 on the assignment.

Accessible Education Services

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Laura Leonard, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by email at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Laura Leonard at your earliest convenience to schedule an appointment.

Academic Integrity

Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No electronic devices other than calculators can be taken out during any class or testing period (this includes cell phones) unless written consent is given by the professor (e.g. Mathematica may be allowed for some tests). Note that looking at or using your cell phone during a test or quiz is considered a violation of Academic Integrity regardless of your purpose or intent in doing so.

Subject Tutoring Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm - 9 pm, Sunday - Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tutors are highly trained Roanoke College students who offer one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences. Tutoring sessions are available in 15, 30, or 45-minute appointments. Feel free to drop by for a quick question or make an appointment at https://libguides.roanoke.edu/subject_tutoring for a longer one-on-one appointment. For questions or concerns, please contact us at 540-375-2590 or subject_tutoring@roanoke.edu.

Tentative
Schedule

Wed	Aug 29	7.1	Intro and Differential Equations
Thurs	Aug 30		No Lab
Fri	Aug 31	7.1 & 7.2	Differential Equations
Mon	Sept 3	5.5	Projectile Motion
Wed	Sept 5	5.6	Applications of Integration
Thurs	Sept 6		Lab 1: Intro to Mathematica
Fri	Sept 7	5.6	Applications of Integration
Mon	Sept 10	5.7	Probability
Wed	Sept 12		Career Services
Thurs	Sept 13		Recitation
Fri	Sept 14	5.7	Probability
Mon	Sept 17		In-Class Lab - Bouncing Ball
Wed	Sept 19		Review
Thurs	Sept 20		Test 1 (Sections 7.1, 7.2, 5.5-5.7)
Fri	Sept 21	10.1 & 10.2	Vectors
Mon	Sep 24	10.3	Dot Product
Wed	Sep 25	10.4	Cross Product
Thurs	Sept 27		Lab 2: Vectors
Fri	Sept 28	10.5	Lines and Planes in Space
Mon	Oct 1	11.1	Vector-Valued Functions
Wed	Oct 3	11.2	Calculus of Vector-Valued Functions
Thurs	Oct 4		Recitation
Fri	Oct 5	11.3	Motion in Space
Mon	Oct 8	9.4	Polar Coordinates
Wed	Oct 10		Review
Thurs	Oct 11		Test 2 (Sections 10.1-10.5, 11.1-11.3, 9.4)
Fri	Oct 12	9.1 & 9.2	Parametric Equations
Fall Break			
Mon	Oct 22	8.1	Sequences
Wed	Oct 24		Donuts!
Thurs	Oct 25		Recitation
Fri	Oct 26	8.2	Series
Mon	Oct 19	8.2	Series
Wed	Oct 31	8.2	Series
Thurs	Nov 1		Recitation
Fri	Nov 2	8.5	Ratio Test
Mon	Nov 5	8.5	Ratio Test
Wed	Nov 7		Review
Thurs	Nov 8		Test 3 (Sections 8.1, 8.2, 8.5)
Fri	Nov 9	8.6	Power Series
Mon	Nov 12	8.6	Power Series
Wed	Nov 14	8.7	Taylor Series
Thurs	Nov 15		Lab 3: Series
Fri	Nov 16	8.7	Taylor Series
Mon	Nov 19	8.8	Applications
Thanksgiving Break			
Mon	Nov 26	8.8	Applications
Wed	Nov 28		In-Class Lab: Hidden Figures
Thurs	Nov 29		Recitation
Fri	Nov 30	8.9	Fourier Series
Mon	Dec 3		Series Wrap-Up
Wed	Dec 5		Review
Thurs	Dec 6		Test 4 (Sections 8.6-8.9)
Fri	Dec 7		Review
Mon	Dec 10		Final Exam: 8:30-11:30AM, Trexler 372
OR Fri	Dec 14		Final Exam: 2-5PM, Trexler 263

Turn In for Correctness Friday, August 31, beginning of class

Chapter 4 Review, problem 12, pg 374

This will be graded on correctness, completeness, and presentation. It does not have to be typed (if you do, you can just email it to me) but please be neat and organized. If you make mistakes and need to cross out something, start over and turn in a neat copy.

This is worth 10 points, 8 for correctness and 2 for presentation. I do not need complete sentences, but I do want to see all of the steps and see explanations when needed. For example, if you integrate by making a substitution $u = \sin(x)$, I would like to see that information written down in the appropriate place along with the follow-up $du = \cos(x)$, and the resulting integral in u , du . If you integrate $2x$ to get x^2 , you do not need to cite the Power Rule or show the 2's cancelling out. Showing all steps is part of "correctness" and copying the answer from Mathematica does not suffice except when that is the only way to get an answer (if you are not clear whether you need to show certain steps, ask!).

Papers turned in after the beginning of class will lose the presentation points, and papers will not be accepted after Friday midnight.