

Northern Virginia Community College
MTH 263-050A, Summer 2024
Calculus I, 4 credits
Dr. Bruce Wahl, Professor

Office and Some Ways to Contact Me:

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Student Hours:

Office (AA 427): Mondays, Tuesdays, Wednesdays and Thursdays: 11:30 AM to 12:30 PM

Lecture Time and Delivery: Mondays, Tuesdays, Wednesdays and Thursdays: 9:00 AM to 11:30 AM, AA 456

Non-Instructional Days: May 27, June 19

Course Description and Purpose:

MTH 263 is the first course in a three-semester course in calculus. The general purpose of this first course is to prepare students for further study in calculus with analytic geometry by providing them with the necessary competencies in finding limits, differentiation, and integration. This course is primarily for students in mathematics, engineering, sciences and other areas requiring strong mathematical backgrounds. MTH 263 presents concepts of limits, derivatives, differentiation of various types of functions and use of differentiation rules, application of differentiation, antiderivatives, integrals and applications of integration. Placement in MTH 263 is by completion of MTH 167 Precalculus with Trigonometry with a grade of C or better, or MTH 161 and 162 Precalculus I and II with grades of C or better, or by placement via the Virginia Placement Test. You may read the complete course content summary at

<https://www.nvcc.edu/dist/files/sites/academics/summaries/MTH263.pdf>

Course Objectives:

- Limits
 - Differentiate between the limit and the value of a function at a point
 - Find the limit of a function by numerical, graphical and analytic methods
 - Apply Limit Laws
 - Calculate one-sided limit of a function
 - Prove the existence of a limit using precise definition of the limit
 - Determine the continuity of a function
 - Calculate Vertical and Horizontal asymptotes using limits
- Derivatives and Differentiation Rules
 - Define Derivatives and Rates of Change
 - Compute derivatives of basic functions using the definition of the derivative
 - Differentiate polynomial, rational, radical, exponential and logarithmic functions
 - Find equation of a tangent line using derivative
 - Differentiate trigonometric functions
 - Apply product, quotient, chain rules
 - Apply implicit differentiation and find derivatives of inverse trigonometric functions
 - Apply concept of rates of change to natural and social sciences
 - Apply the concept of related rates
 - Define hyperbolic functions and their derivatives
 - Find linear approximation of a function at a given point
- Applications of Differentiation
 - Calculate local and absolute maximum and minimum values of a function
 - Apply Rolle's Theorem and Mean Value Theorem to study properties of a function
 - Find critical points, and intervals of increasing and decreasing values of a function
 - Find points of inflection and intervals of different concavities
 - Sketch a curve for a given function
 - Apply rules of differentiation to solve optimization problems
 - Find antiderivatives for basic functions using knowledge of derivatives

- Integration
 - Relate areas to definite integrals using sigma notation, Riemann Sums, and limits
 - Apply Fundamental Theorem of Calculus to find definite integrals and derivatives
 - Find indefinite integrals of polynomials and basic trigonometric and exponential function
 - Apply Net Change Theorem
 - Perform integration using substitution rule
 - Find areas between curves
 - Find average value of a function

Textbook:

Stewart, J., Clegg, D., & Watson, S. (2021). *Calculus: Early transcendentals*. Cengage.

Note: Please read the following options before purchasing your textbook. WebAssign is optional in this class.

1. The NVCC Alexandria Bookstore sells your text with an option including WebAssign access. This book will be used at the Alexandria campus for MTH 264 and MTH 265. Using the access code from the book, you will create a WebAssign account at www.webassign.com and you need the Class Key: **nvcc 6000 8607**
2. If you want only an online book, WebAssign gives you access to online homework and some resources **including the text**; for this you need the Class Key: **nvcc 6000 8607**
3. You may purchase a used book or rent a book (use ISBN 978-1-337-61392-7).
4. **EVERYONE HAS FREE ACCESS TO THE ONLINE BOOK IN WEBASSIGN FOR ABOUT 10 DAYS! USE IT!**

Calculator: A graphing calculator is strongly suggested. I recommend purchasing a TI-89 or TI-Nspire CAS (but see the note below).

Smartphone Scanner App: You may need to use a free smartphone scanner app (like Genius Scan—you should watch the 22 second video at <https://thegrizzlylabs.com/genius-scan/>) to scan some of your work this semester.

Syllabus:

Chapter 2: §§1-8

Chapter 5: §§1-5

Chapter 3: §§1-11

Chapter 6: §1, 5

Chapter 4: §§1-7, 9

(NOTE: Chapter 1 is a review of precalculus. Review if you need to get current!)

Grading Policy: There are 4 components that will determine your grade:

1. Attendance—5%
 2. Homework—10%
 3. Chapter Exams (3 given, about 1 hour each, lowest exam grade dropped)—50%
 4. Final Exam (100 minutes, comprehensive)—35%
- In general, 90%-100% = A, 80%-89.9% = B, 70%-79.9% = C, 60%-69.9% = D, below 60% = F. I reserve the right to lower the curve but will not raise the curve. No audits are given in this class. The last day to drop with refund is May 28, 2024. The last day to withdraw to receive a "W" grade is June 14, 2024. If you choose to drop or withdraw from this class, you are responsible for doing all the necessary steps online before these dates. **Note: I will not approve withdrawals after June 14, 2024 without written documentation.**
 - **Attendance:** Attending this class is very important. You may miss two classes with no grade penalty. Each class missed after that will result in a 1% drop from the possible 5% attendance grade. My experience is that students who miss class often are putting their education at a low priority and that they are more likely to fail or withdraw from the course. On the other hand, regular attendance with active class participation usually results in a passing grade.
 - **Homework:** Your homework for each section of the book that we cover is at the end of this syllabus. You should complete these problems after we have covered the material in class. You will turn in your written homework on exam days.

Chapter Exams: One hour each, covering material from the textbook as listed below.

Exam #1 (Chapter 2) is tentatively scheduled for May 30, 2024. (Homework will be due at the exam.)

Exam #2 (Chapter 3) is tentatively scheduled for June 11, 2024. (Homework will be due at the exam.)

Exam #3 (Chapter 4) is tentatively scheduled for June 24, 2024. (Homework will be due at the exam.)

Note: Homework in Chapters 5 and 6 will be due at the Final Exam on July 1, 2024.

If you know you will not be able to complete the exam during class time on any of these days (for example, for required military duty), please see me well in advance; we may be able to make alternate plans. You may miss *one* exam and that will be your dropped score. You may miss a *second* exam with a valid excuse and take a makeup exam. All makeup exams will be given in the final week of class (June 24-27, 2024). It is your responsibility to schedule the make-up exam with me! The exam will cover the same material as the original but will be an oral exam scheduled in a classroom. More than two missed exams will result in scores of 0 for those exams..

Final Exam: On Monday, July 1, 2024, the final exam will be given from 9:00 AM to 10:40 AM. The exam will be comprehensive—covering all material we covered in the fifteen weeks. **All students are expected to attend the final exam on Monday, July 1, 2024, from 9:00 AM to 10:40 AM.** Homework in Chapters 5 and 6 is due at the Final Exam.

- **Exams are individual efforts. Any proof of cheating on an exam results in a score of 0 on that exam, and that score will not be dropped. Cheating includes both receiving and giving help. Cheating also includes invalid absences for exams.**

Notes:

1. You are responsible for your own attendance. If you miss a class, you are responsible for reviewing the material in the textbook or online (there are lots of good lecture videos on YouTube) and getting notes from a classmate.
2. It is **recommended** that you have a graphing calculator for this class. I will allow you to use any calculator on most exams, so it is to your advantage to purchase one. You may not use cell phones or any other connected devices as calculators on exams. I have a TI-83, TI-86 and a TI-89 and have access to other models such as the TI-84, and TI-92. I **strongly** encourage you to invest in a TI-89 or TI-Nspire CAS. **Note:** I have had other students in the past buy the cheaper models and they were disappointed when they saw how easy the TI's were to use. Please consider this in your choice. It is up to you to have a calculator and to practice using it. For this class, another useful smartphone app is WolframAlpha. Look it up in your app store. It costs a few dollars, but it is worth it!
3. Doing homework is vitally important in any course you take! Especially in math, it is important to do homework every day. Homework includes reading the textbook and doing the problems in the chapter text, doing assigned problems, exploring the resources in WebAssign, attending help sessions and student hours, and participating in a study group. I expect a **minimum of 20 (yes 20!) hours per week in homework**—the “2 for 1” rule—you put in at least two hours of study for every one hour of class per week. Note that this is a minimum time—you may need to put in significantly more time into this class to be as successful as you want to be! Please remember that I have 10 Student Hours a week in which I can help you in my office or on Zoom. The Academic Success Center (ASC) in Bisdorf (AA) 229 also has tutoring. You can find their information at <https://blogs.nvcc.edu/asc/>.
4. Special Needs and Accommodations. Please address with me any special problems or needs at the beginning of the semester. If you are seeking accommodations based on a disability, you must provide a disability data sheet, which can be obtained from the counselor for special needs, (703) 845-6301.
5. Please see the “NOVA Policies” link on CANVAS for more information from the college on topics like Academic Integrity, Withdrawal Policies, and Wellness and Mental Health.

Written Homework

Stewart, J., Clegg, D., & Watson, S. (2021). *Calculus: Early transcendentals*. Cengage.

You must do *at least* the problems listed below for each section of the book. Please note that most of the odd problems have answers in the back of the book. **Try to avoid using the solutions as a quick way to solve a problem. Struggling with problems is often the best way to learn!** If you wish to do even-numbered problems, feel free to drop by my office to check the solutions with me.

Please note the order of the sections—this is the order in which we will cover the material and the material over which you will be tested.

Chapter 1: Review—pick problems from pp. 68-69 and try some. Review what you need to be ready for class!

§2.1 (1, 3, 5, 7)

§2.2 (1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 25, 29, 33, 37, 41, 44)

§2.3 (1, 11, 13, 19, 21, 23, 25, 31, 35, 37, 39, 49, 53)

§2.4 (1, 3, 5, 7, 9, 15, 17, 19)

§2.5 (3, 5, 7, 9, 11, 13, 17, 19, 23, 25, 35, 41, 45, 53, 55, 57, 59)

§2.6 (3, 5, 7, 9, 11, 13, 15, 19, 23, 27, 31, 35, 39, 45, 47, 49, 57, 61, 65)

§2.7 (3, 5, 11, 12, 15, 17, 21, 23, 31, 37, 43, 55)

§2.8 (1, 3, 5, 7, 9, 11, 13, 15, 21, 25, 27, 37, 41, 43, 47, 48, 49, 51, 59)

Exam #1 (Chapter 2) on May 30. Written homework due at the start of the exam.

§3.1 (3, 7, 9, 11, 13, 17, 19, 23, 25, 33, 37, 45, 49, 51, 53, 55, 57, 59, 65)

§3.2 (1, 5, 7, 13, 17, 23, 27, 31, 35, 43, 45, 49, 51)

§3.3 (1, 5, 9, 13, 15, 17, 27, 29, 35, 37, 39, 41, 47, 51, 61)

§3.4 (1, 5, 7, 9, 11, 13, 17, 21, 23, 27, 31, 35, 37, 49, 53, 55, 57, 59, 65, 71, 77, 83, 85)

§3.5 (5, 9, 11, 15, 21, 25, 27, 31, 35, 37, 39, 43, 47)

§3.6 (3, 5, 7, 11, 15, 19, 23, 29, 33, 39, 45, 47, 49, 51, 63, 67, 69, 71, 77)

§3.7 (1, 7, 11, 15, 17, 25, 33)

§3.8 (1, 3, 9, 15)

§3.9 (3, 5, 9, 13, 17, 25, 29, 37, 45)

§3.10 (3, 5, 7, 13, 15, 19, 23, 27, 31, 33, 35, 41, 43)

§3.11 (1, 3, 5, 7, 11, 19, 35, 37, 41, 43, 47, 51)

Exam #2 (Chapter 3) on June 11. Written homework due at the start of the exam.

§4.1 (3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 27, 29, 35, 39, 41, 47, 51, 59, 61, 69, 75)

§4.2 (1, 3, 5, 9, 11, 15, 19, 40)

§4.3 (1, 5, 9, 13, 17, 21, 27, 29, 35, 37, 43, 45, 53, 63, 75, 77)

§4.4 (9, 11, 13, 15, 19, 23, 27, 31)

§4.5 (1, 9, 15, 29, 35, 43, 51, 65)

§4.6 (7, 17, 21, 28)

§4.7 (3, 7, 9, 11, 13, 19, 41, 54, 65)

§4.9 (1, 7, 9, 11, 13, 17, 19, 21, 25, 27, 31, 39, 45, 51, 59, 61, 65, 75)

Exam #3 (Chapter 4) on June 24. Written homework due at the start of the exam.

§5.1 (1, 3, 9, 13, 17, 21)

§5.2 (1, 5, 7, 21, 29, 35, 37, 41, 45, 59, 61)

§5.3 (3, 7, 11, 13, 15, 17, 19, 23, 25, 29, 31, 37, 41, 47, 51, 55, 61)

§5.4 (1, 5, 9, 13, 15, 17, 21, 27, 31, 33, 37, 41, 49, 53, 61, 69, 75)

§5.5 (3, 5, 7, 9, 11, 15, 17, 21, 25, 27, 31, 33, 37, 41, 45, 49, 59, 65, 75, 81, 87)

§6.1 (1, 3, 9, 13, 17, 23, 25, 27, 37, 55, 56)

§6.5 (3, 5, 9, 15, 17)

Final Exam (comprehensive) on July 1 at 9: 00 AM. Written homework due at the start of the final exam.

NOTE: ALL INFORMATION IN THIS SYLLABUS IS SUBJECT TO CHANGE!