**Birmingham-Southern College**

# MA 231 Calculus I

# Spring 2020

## Instructor: Dr. Bernadette Mullins Classroom: Olin 202

## Office Hours: MWF: 1:30 – 2:30 Class Times: A: MWF 9:30 - 10:30

## TTH: 1:00 – 2:00 B: MWF 11:00 - 12:00

## and by appointment Email: [bmullins@bsc.edu](mailto:bmullins@bsc.edu)

## Office: Olin 110 Phone: 205-226-3026

**Required Textbook**: Deborah Hughes-Hallett, et. al., *Calculus: Single Variable*, 7th edition, Wiley. The WileyPlus access code (which includes access to an online textbook and homework) is required. You may choose either just the access code *or* the access code bundled with an actual paper textbook. The choice is up to you: if you like reading an e-book, buy the stand alone access code; if you prefer reading a physical book, buy the access code bundled with the textbook (but don’t but the code and textbook separately as that would cost more).

**Course Overview**: This course is required for the mathematics major and the mathematics minor and also satisfies the general education requirement in Quantitative Analysis (QA). This is the first in a three-course calculus sequence. This course covers differential calculus, the definition of the definite integral, and the fundamental theorem of calculus. We believe that calculus is not about memorizing procedures or pushing buttons to get the right answers to scores of template problems. Rather, to do calculus is to use mathematics to describe, understand, and solve real problems. This course promotes conceptual understanding as well as procedural fluency and practical application and examines problems from multiple perspectives, including graphical, numerical, analytical, and descriptive approaches.

**Catalog Description**: A course in calculus emphasizing graphical, numerical, analytical, and descriptive points of view. Topics include functions, derivatives, definite integrals, and the Fundamental Theorem of Calculus. A primary learning objective is a working knowledge of differentiation. Not open to students who have passed MA 232 or equivalent.

**Online Calculus Tutoring**:

I encourage you to take advantage of the free mathematics tutoring online offered through Microsoft Office Teams.

**Calculus I Student Learning Outcomes**: By the end of this course you should be able to:

* Use mathematics to articulate and investigate questions about the world around you;
* Understand the meaning of the derivative and interpret derivatives in applied contexts;
* Demonstrate procedural fluency with the standard techniques of differential calculus;
* Apply these techniques resourcefully to formulate and solve a variety of problems about quantities that change in disciplines such as biology, business, chemistry, economics, mathematics, and physics;
* Understand the definition of the definite integral and the Fundamental Theorem of Calculus;
* Estimate and calculate limits, derivatives, and integrals graphically, numerically, and analytically;
* Use a technology effectively to experiment, solve problems, and verify results;
* Read and digest mathematical text; and
* Collaborate responsibly and productively.

**Quantitative Problem Solving Student Learning Outcomes**:

By the end of this course you should be able to appropriately use mathematical methods to solve quantitative problems as follows:

* frame a problem quantitatively by transferring information or data into a mathematical or statistical model or formal notation;
* solve the problem using mathematical concepts and strategies, with the aid of technology where appropriate;
* think critically about the quantitative results and interpret the results in the context of the original problem; and
* communicate findings in written or oral format.

**Grading Scale**: **Grades Will Be Determined By**:

93 – 100 A In-class Homework 5%

90 – 92 A- Online Homework 10%

87 – 89 B+ Exam 1 15%

83 – 86 B Exam 2 15%

80 – 82 B- Exam 3 15%

77 – 79 C+ Exam 4 15%

73 – 76 C Final Exam Review 5%

70 – 72 C- Comprehensive Final Exam 20%

67 – 69 D+

60 – 66 D Midterm grades are based exclusively

00 – 59 F on exams (not homework assignments).

**Course Policies:**

* **Readings**: Readings for the course are taken from the required textbook. It is essential that you read each section actively by solving the problems and making notes as you read. Bring any questions you have to class or office hours.
* **Homework**: Homework is required for each class day through the WileyPlus online homework system. Homework submitted late will receive no credit; however, your lowest three scores will be dropped to allow for occasional extenuating circumstances. Consistently keeping up with the homework is essential to success. You may collaborate on solving homework problems. I hope you will learn from one another and benefit from working together. However, it is imperative that you understand any work you submit and are able to solve problems on your own on the exams. A good guideline is that, if you submit a homework problem for a grade, you should feel confident that you are able to explain your solution to the class.
* **Exams**: All exams are individual exams with no collaboration allowed. A make-up exam will be scheduled only when requested within the first two weeks of the term for a valid and verifiable reason, or in case of an emergency.
* **Final Exam Review**: You will complete a required review for the comprehensive final exam on WileyPlus with unlimited tries on each question.
* **Attendance**: I will do my best to make every class worth your time. Please be on time to class. Attendance every day is expected and essential to success. Please let me know in advance if it is necessary to miss class. For College-sponsored events and religious holidays, please give me a list of all absences for the semester within the first two weeks of the term.
* **Questions**: Please ask questions in class whenever you have them. I am also happy to answer questions in my office.
* **Cell Phones**: Please silence your cell phone and put it away during class. Please refrain from reading or sending texts or looking at your phone during class.
* **Communication**: I will post important course information on Moodle and send emails to the class. It is your responsibility to check Moodle and email regularly.
* **Changes to the Syllabus**: This syllabus is subject to changes announced in class and posted to Moodle.

##### Academic Integrity

Adhere to the honor code at all times. The Honor Oath reads: “As a member of the student body of Birmingham-Southern College, I recognize my responsibility to the traditions of the institution, to my fellow students and to myself. I recognize the significance of the honor system. I pledge that I have read and understand the Constitution of the Honor Council, including the Honor Code, and agree to be bound by its provisions.” If you have witnessed, been the victim of, or knowingly or unknowingly participated in an Honor Code violation, please talk to your instructor immediately. The Honor Code mandates immediate, honest disclosure of such violations. A student found in violation of the Honor Code on an exam or assignment will receive a zero grade for that portion of the course or for the course as a whole, and may be subject to further disciplinary action (such as suspension or expulsion) at the discretion of the Honor Council. Additional information on the honor code and violations can be found in the [Birmingham-Southern Student Handbook](https://www.bsc.edu/campus/studev/student-handbook/7/) and on [the BSC website](https://www.bsc.edu/campus/studev/honor-council/index.html).

**Accessibility**

Birmingham-Southern College complies with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act. If you have a disability and need academic accommodations in this course, please speak with me privately as soon as possible so I can be prepared to meet your needs. Students who plan to use academic accommodations must first complete the academic accommodation request process with the Office of Accessibility which will provide an academic accommodation letter for you to share with me outlining your needs. If you have not already completed the process with the Office of Accessibility, please contact that office as soon as possible at accessibility@bsc.edu. If you prefer to call the office, the number is (205) 226-7909. Visit the [Office of Accessibility website](https://www.bsc.edu/campus/accomodations/index.html) for additional information.

##### BSC Counseling Services

##### BSC Counseling Services offers students of all backgrounds, races, religious beliefs, sexual orientations, gender identities, abilities, ethnicities, and cultures a safe place to discuss and resolve issues that interfere with personal and academic goals. The Counseling Services office recognizes and honors the complex intersectionality of all aspects of a person’s identity and presenting concerns. All enrolled BSC students are eligible for counseling at no cost. Students can schedule an appointment by calling 205-226-4717, or in-person on the second floor of Norton Campus Center in the Counseling & Health Services suite next to Student Development.

**Title IX**

Birmingham-Southern College is committed to the creation and maintenance of a safe learning environment for students and the campus community. The College forbids any type of sexual or gender-based misconduct among its students, faculty, and staff. The College encourages all members of the academic community to report suspected sexual and gender-based misconduct to the appropriate authorities so that it can be investigated, remedied, and eliminated. Such misconduct is prohibited whether the actor is a student, faculty member, staff member, contractor, visitor, or another member of the College community. BSC forbids retaliation against any person who has opposed, reported or participated in an investigation concerning sexual or gender-based misconduct. In accordance with federal policy, all College employees are required to report information related to discrimination and harassment which includes, but is not limited to, sexual assault, relationship violence, stalking, and sexual harassment. For this reason, if you tell a faculty member about a situation of sexual harassment or sexual violence or other related misconduct, the faculty member must share that information with the Title IX coordinator. As a student, you can report allegations of sexual misconduct to officials in Student Development (Assistant Dean of Students, Associate Dean of Students, or Vice President for Student Development), Campus Police, or confidential resources in Counseling Services, Health Services, and Religious Life. Please refer to the [Title IX section](https://www.bsc.edu/titleix/index.html) of the BSC website for more information on filing a report and available resources.

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| **Week** | **Date** |  |  | **Date** |
| 1 | M | Feb | 3 | 1.7: Intro to Limits |
|  | W | Feb | 5 | 1.8-1.9: Limits and Continuity |
|  | F | Feb | 7 | 2.1-2.2: Speed & Derivative at a Point |
| 2 | M | Feb | 10 | 2.3: Derivative Function |
|  | W | Feb | 12 | 2.3: Derivative Function |
|  | F | Feb | 14 | 2.4: Interpretations of the Derivative |
| 3 | M | Feb | 17 | 3.1-3.2: Derivatives of Polynomials & Exponential Functions |
|  | W | Feb | 19 | 3.1-3.2: Derivatives of Polynomials & Exponential Functions |
|  | F | Feb | 21 | **Exam 1** |
| 4 | M | Feb | 24 | 3.3: Product and Quotient Rules |
|  | W | Feb | 26 | 3.3: Product and Quotient Rules |
|  | F | Feb | 28 | 3.4: Chain Rule |
| 5 | M | Mar | 2 | 3.4: Chain Rule |
|  | W | Mar | 4 | 3.5-3.6: Derivatives of Trig & Inverse Functions |
|  | F | Mar | 6 | 3.5-3.6: Derivatives of Trig & Inverse Functions |
| 6 | M | Mar | 9 | 2.5-2.6: Second Derivative and Differentiability |
|  | W | Mar | 11 | 2.5-2.6: Second Derivative and Differentiability |
|  | F | Mar | 13 | **Exam 2** |
| 7 | M | Mar | 16 | **Classes Cancelled** |
|  | W | Mar | 18 | **Classes Cancelled** |
|  | F | Mar | 20 | **Classes Cancelled** |
| 8 | M | Mar | 23 | **No Classes--Spring Break** |
|  | W | Mar | 25 | **No Classes--Spring Break** |
|  | F | Mar | 27 | **No Classes--Spring Break** |
| 9 | M | Mar | 30 | Transition to Online Instruction |
|  | W | Apr | 1 | 3.7: Implicit Differentiation |
|  | F | Apr | 3 | 3.7: Implicit Differentiation |
| 10 | M | Apr | 6 | 4.6: Related Rates |
|  | W | Apr | 8 | 4.6: Related Rates |
|  | F | Apr | 10 | **No Classes--Good Friday** |
| 11 | M | Apr | 13 | Exam Review |
|  | W | Apr | 15 | **Exam 3** |
|  | F | Apr | 17 | 4.1: Using First & Second Derivatives |
| 12 | M | Apr | 20 | 4.1: Using First & Second Derivatives |
|  | W | Apr | 22 | 4.2: Global maxima |
|  | F | Apr | 24 | 4.3: Optimization |
| 13 | M | Apr | 27 | 4.3: Optimization |
|  | W | Apr | 29 | 5.1: Distance Traveled |
|  | F | May | 1 | **Exam 4** |
| 14 | M | May | 4 | 5.2: Definite Integral |
|  | W | May | 6 | 5.3-5.4: Fundamental Theorem of Calculus & Integral Rules |
|  | F | May | 8 | 6.1-6.2: Antiderivatives |
| 15 | M | May | 11 | Review |
|  | W | May | 13 | Comprehensive Final Exam for MWF 9:30 Class @ 9:00-12:00 noon |
| 16 | M | May | 18 | Comprehensive Final Exam for MWF 11:00 Class @ 9:00-12:00 noon |