

**MONTGOMERY COLLEGE - Germantown Campus**  
**Mathematics & Statistics Department**  
**Course Syllabus**

## I. Instructor Information

Professor: Zhou Dong

Email: Zhou.Dong@MontgomeryCollege.edu

Phone: (240) 567-7810

Office: HT 134 Germantown campus

Office Hours:

Office hours	MWF 9:30 am – 11:00 am in HT134
Appointment hours	MT 1:00 pm – 2:30 pm
<a href="#">Click here to book an appointment</a>	

## II. General Course Information

Calculus I – MATH181

4 credits / 5 hours (For computation of tuition, this course is equivalent to five semester hours. Five hours each week.)

Intended primarily for students of the physical sciences, engineering, and mathematics. An introduction to major ideas of single variable calculus including limits, derivatives, and integrals of algebraic and transcendental functions; applications.

MATH181 fulfills a General Education Program Mathematics Foundation requirement.

PREREQUISITE:

A grade of C or better in MATH 165, appropriate score on mathematics assessment test, or consent of department. Assessment levels: ENGL 101/101A or AELW 940, READ 120 or AELR 930.

Fall 2022: CRN 21318

Class Times: MWF 11:00 am – 12:25 pm

Class Room: HT 403

## III. Common Course Student Learning Outcomes

Upon course completion, a student will be able to:

- Determine when and how to apply the Fundamental Theorem of Calculus.
- Evaluate limits graphically, algebraically, and numerically.
- Explain and distinguish between average and instantaneous rates of change and be able to interpret each within the context of an applied problem.
- Find a derivative directly from the definition of a derivative.

- Identify and apply the appropriate rule(s) for symbolic differentiation.
- Implicitly differentiate a function.
- Interpret derivatives verbally in the context of an application.
- Interpret limits verbally.
- Interpret the definite integral as a limit of sums.
- Interpret the indefinite integral as an inverse process of differentiation and evaluate indefinite integrals.
- Set up and evaluate definite integrals to solve applied problems, such as problems involving area, motion, and net change.
- Use derivatives to determine the extreme values of a function.
- Use derivatives to model and analyze a variety of applications, such as problems involving optimization, related rates, and motion.
- Use first and second derivatives to obtain information about the graph of a function and use the graph of a function to obtain information about its first and second derivatives.
- Use technology to discover, explore, illustrate, and understand limits, derivatives, and integrals.

#### IV. Textbooks, Workbooks, and Supplies

Required materials for the course:

- *Calculus: Concepts and Contexts*, 5<sup>th</sup> edition by James Stewart and Steve Kokoska
  - Available as ebook via WebAssign
- *WebAssign*
  - Online homework and ebook access
- *Graphing calculator*
  - A TI-83 or TI-83 Plus (<http://wabbitemu.org/>)
  - Desmos ([www.desmos.com/calculator](http://www.desmos.com/calculator))
- *Microsoft Teams*– for course announcements and communication outside of class
  - MC students can download these programs for free from their [Microsoft 365 account accessed through MyMC](#).
  - [Link to Team](#)

#### V. Course Design

This course is designed to give the student a high degree of autonomy and students are expected to self-direct their learning. While many resources are provided for the student to aid in their learning, the final course grade is based solely on the student's mastery of the course standards as determined through assessments (see section B. Course Grade for details). This means it is up to the student to determine which resources to use (e.g. class attendance, textbook, lecture videos, online practice problems, etc.) in order to gain mastery of the course standards. Feedback on online assignments are provided for learning purposes only and will not affect the student's final course grade.

## A. Bloom's Taxonomy

This class has been designed based on Bloom's Taxonomy. A basic understanding of Bloom's Taxonomy will help the student understand the course design as well as make better choices about how best to gain mastery of the material and be successful in this class.

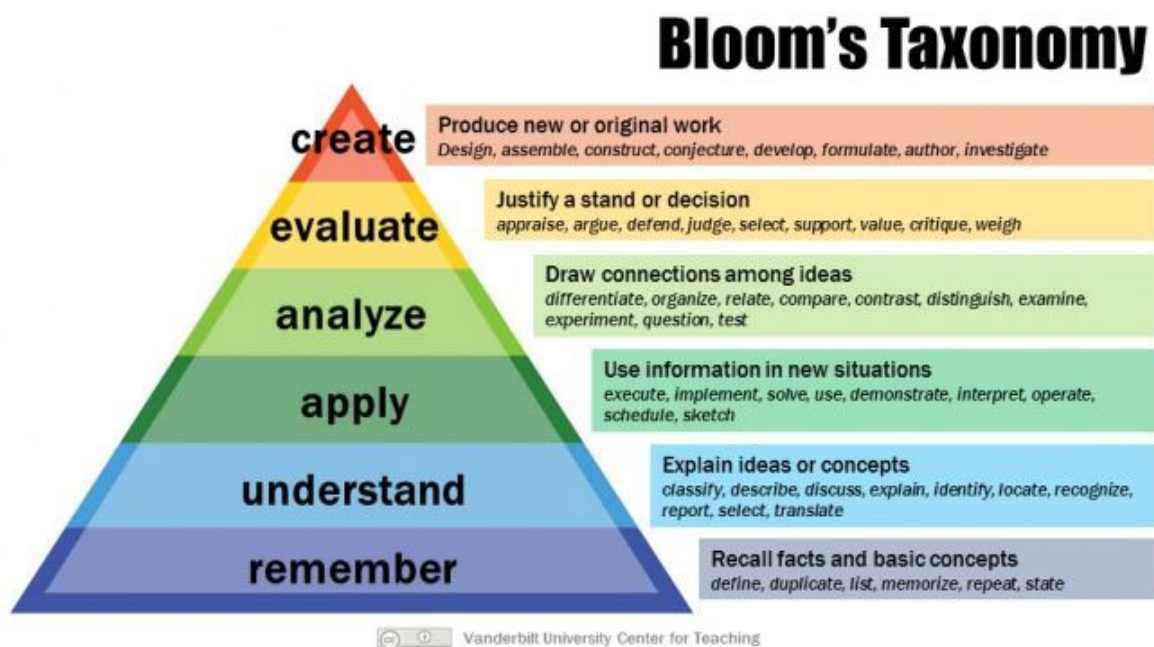


Figure 1 - Bloom's Taxonomy, from <https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>

## B. Flipped Classroom Instruction

Under the flipped classroom model, students begin learning the course material at home before class, while class time is focused on solidifying understanding through active discussion and problems solving:

### ***Before class:***

- Read textbook or lecture slides, or watch lecture videos
- Self-assess using Pre-class Assessment on WebAssign
- Prepare questions for class discussion

### ***During class:***

- Participate in class discussion
- Work in groups or individually on in-class assignments
- Receive individual and/or small group instruction as needed
- Take assessments as scheduled

### ***After class:***

- Complete Practice Problem Assignments on WebAssign
- Take practice quizzes in the Personal Study Plan on WebAssign
- Get help from instructor during office hours or by appointment
- Utilize MAPEL Center tutoring

## The Flipped Classroom

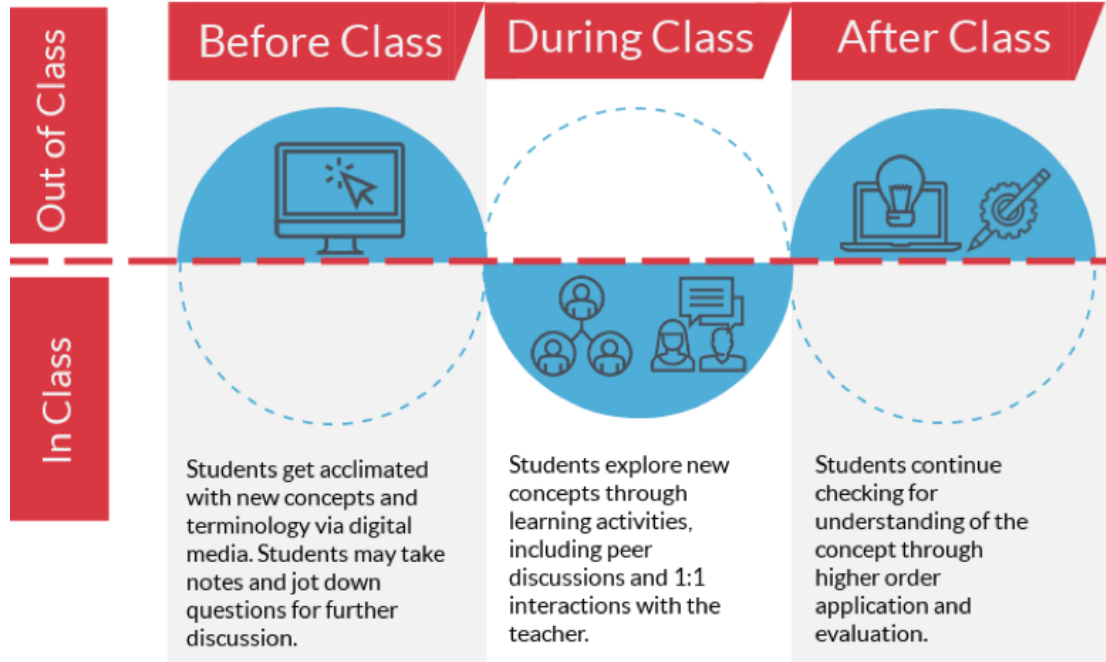


Figure 2 - The Flipped Classroom, from <https://www.odysseyware.com/blog/using-classpace-flipped-classroom>

## Bloom's Taxonomy in a Flipped Classroom

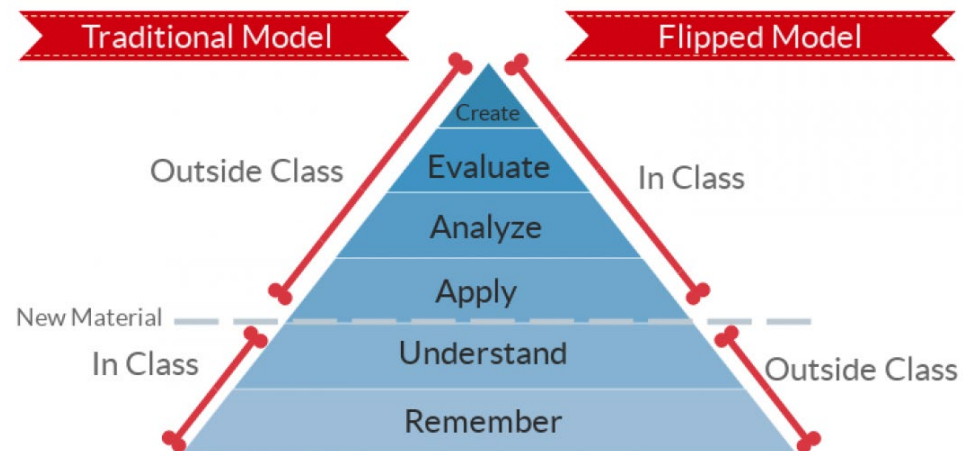


Figure 3- Bloom's Taxonomy in a Flipped Classroom, from <https://www.odysseyware.com/blog/using-classpace-flipped-classroom>

While preparing for class, students have their initial exposure to the new material through reading the textbook and lecture slides and watching lecture videos. The focus at this time is on the *Remember* and *Understand* levels of Bloom's Taxonomy:

- Memorize definitions and theorems
- Paraphrase definitions and theorems

- Understand worked examples

During class, students work with each other and the instructor to develop the *Apply*, *Analyze*, and *Evaluate* levels of Bloom's Taxonomy. Occasionally, students are expected to reach the *Create* level of Bloom's Taxonomy. After class, students should focus on consolidating their learning through additional practice and self-assessment in order to demonstrate mastery of course standards.

It is essential that students put in the time and effort necessary in and out of class. It is generally recommended that for each hour of in-class time, the student spends 2-3 hours out of class studying. This class meets for 5 hours each week, therefore, ***students should expect to spend 10 – 15 hours outside class time studying for this class.***

## VI. Course Requirements

### A. Course Standards

This course uses Standards Based Grading (SBG). Under SBG, students are graded based on demonstrated mastery of the course standards. The standards are separated into core standards and elective standards. The core standards are essential material and EACH standard must be mastered in order to earn a grade of "C" or above. Most core standards are at the Apply and Analyze levels of Bloom's Taxonomy. The elective standards are either optional topics or a higher level question for a core standard topic. Detailed grading criteria can be found in section D. Course Grade and section E. Standards.

### B. Course Grade

This course uses Standards Based Grading. Your course grade will be based solely on mastery of the course standards. Assessments of standards will be graded as follows:

Score	Mastery Level	Student work
4	Perfect Mastery	Demonstrates complete understanding of the underlying concept and provides correct solution with appropriate notation and use of language
3	Imperfect Mastery	Demonstrates complete understanding of the underlying concept but has minor errors in calculation and/or problems with notation and use of language
2	Developing	Demonstrates developing but incomplete understanding of the concept and/or major errors in the computation and presentation of the solution
1	Novice	Demonstrates little to no understanding of the concept with some relevant computations
0	No evidence	Demonstrates no evidence of understanding or not attempted

Both Perfect Mastery (score = 4) and Imperfect Mastery (score = 3) are considered mastery. A student is only required to demonstrate mastery on a standard once.

There will be three (3) opportunities for demonstrating mastery on each standard:

1. Initial assessments (weekly)
2. Reassessment on the 4 Exams as scheduled
3. Final assessment on the Final Exam as scheduled

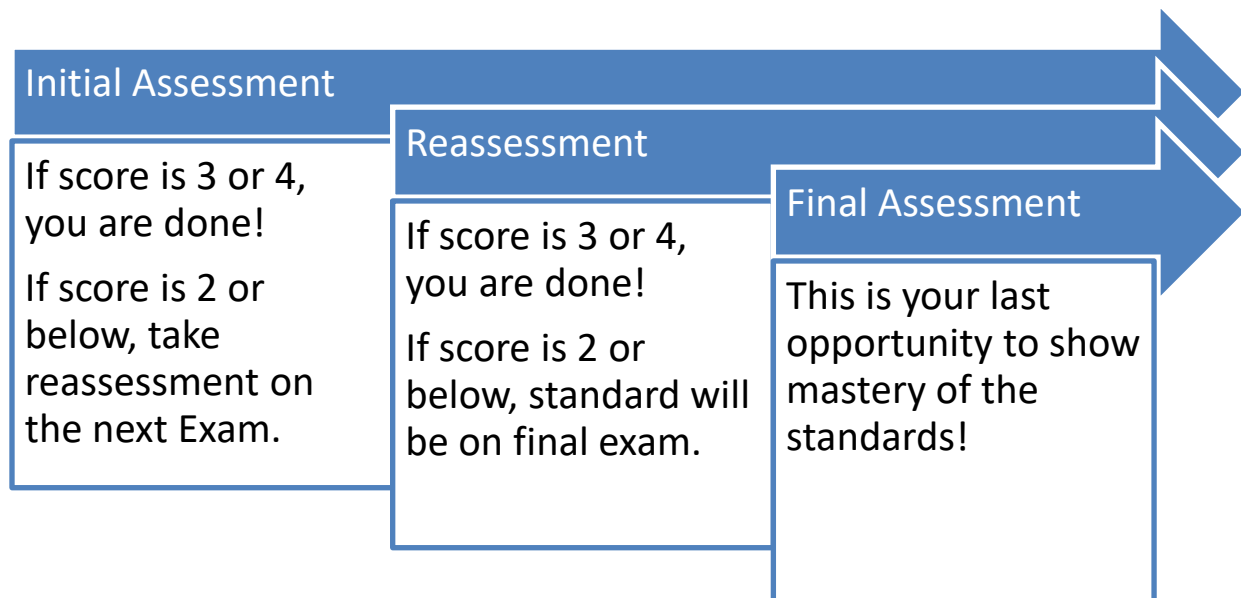


Figure 4 Assessment flow chart

### C. Standards

Final letter grades will be determined according to this rubric:

Grade	Core Standards	All standards (Core and Elective)
A	Mastery on all	Average score is 3.5 or above
B	Mastery on all	Average score is between 3 and 3.5
C	Mastery on all	Average score is below 3
D	Not all mastered	Average score is above 2
F	Not all mastered	Average score is below 2

Note:

- Mastery means a score of 3 or 4.
- For the grades of A, B, or C, you must demonstrate mastery on ALL Core Standards.

### D. Assessments and Make-up Policy

Initial Assessments will take place on Monday of each week starting on Week 3.

Exams for reassessments and the final assessments are scheduled as follows:

Exam	Date	Material covered
Exam 1	Monday 10/3	Reassessment on 2.1 – 2.7
Exam 2	Monday 10/24	Reassessment on 3.1 – 3.8

Exam 3	Monday 11/21	Reassessment on 3.9, 4.1 – 4.7
Exam 4	Friday 12/9	Reassessment on 4.8, 5.1 – 5.4
Final Exam	Wednesday 12/14 (10:15 am – 12:15 pm)	Final assessment on all sections

Make-ups for missed assessments will not be available. All assignments on WebAssign have been set up to approve all extension requests automatically.

## VII. Student Code of Conduct

### A. Standards of College Behavior

Students are expected to adhere to the Montgomery College Student Code of Conduct: [https://www.montgomerycollege.edu/\\_documents/policies-and-procedures/42001-student-code-of-conduct.pdf](https://www.montgomerycollege.edu/_documents/policies-and-procedures/42001-student-code-of-conduct.pdf)

### B. Academic Honesty

All assessments in this class are closed-notes, closed-book, and individual. No collaboration is allowed on any assessment. Students should refer to the Student Code of Conduct or the following excerpt for more details:

[https://www.montgomerycollege.edu/\\_documents/academics/support/learning-centers/writing-reading-learning-ctr-germantown/academic-dishonesty-and-how-it-is-handled.pdf](https://www.montgomerycollege.edu/_documents/academics/support/learning-centers/writing-reading-learning-ctr-germantown/academic-dishonesty-and-how-it-is-handled.pdf)

## VIII. Collegewide Policies and Procedures

### A. Attendance Policy

Students are encouraged to attend and actively participate in all class meetings. As group work is often part of class, students who regularly miss class will no longer be assigned a group. Students who miss more than one week of class and assessments may be dropped from the course for excessive absences as per the Montgomery College [Academic Regulations and Standards](#).

### B. Withdrawal and Refund Dates

- Refund Drop Deadline – September 6, 2022
- No Grade Drop & Audit/Credit Deadline – September 20, 2022
- W Grade Drop Deadline – November 15, 2022

### C. Audit Policy

All students registered for audit are required to consult with the instructor before or during the first class session in which they are in audit status, and students are required to participate in all course activities unless otherwise agreed upon by the student and instructor at the time of consultation. Failure to consult with the instructor or to so participate may result in the grade of “W” being awarded. This action may be taken by the instructor by changing the “AU” to “W” before the drop with “W” date.

#### **D. Disability Support Services**

Any student who needs an accommodation due to a disability should make an appointment to see me during my office hours. In order to receive accommodations, a letter from Disability Support Services (G-SA 189; R-CB 122; or TP/SS-ST 122) will be needed. Any student who may need assistance in the event of an emergency evacuation must identify to the Disability Support Services Office; guidelines for emergency evacuations for individuals with disabilities are found at:

<http://www.montgomerycollege.edu/dss>

#### **E. Veteran's Services**

If you are a veteran or on active or reserve status and you are interested in information regarding opportunities, programs and/or services, please visit the Combat2College website at <http://www.montgomerycollege.edu/combat2college>

#### **F. Delayed Opening or Closing of the College**

If a class can meet for 50% or more of its regularly scheduled meeting time OR if the class can meet for 50 minutes or more, it will meet. Montgomery College will always operate on its regular schedule unless otherwise announced. Depending on the nature of the incident, notifications of emergencies and changes to the College's operational status will be communicated through one or more communication methods including the College's website <http://www.montgomerycollege.edu>. For the most up-to-date information regarding College openings, closings, or emergencies, all students, faculty, and staff are encouraged to sign up for email and text alerts via Montgomery College ALERT. Registration information is available at <http://www.montgomerycollege.edu/emergency>.

#### **G. Communication**

This course will use your official Montgomery College email address and Microsoft Teams for communication. This course will NOT use Blackboard for communication.

### **IX. Honors Module**

This class has an attached honors module for eligible students. Enrollment is limited to students who meet Honors Program eligibility standards. If you are interested in taking this as an honors class, you must meet with the instructor during the first two weeks of classes.

#### **A. Honors Eligibility**

- Completion of at least 12 Montgomery College credits
- Cumulative 3.4 grade point average or higher
- Grade of A or B in ENGL 101 or ENGL 101A



## X. Schedule

### A. Class Meeting Schedule

MATH 181 Spring 2022 Class Meeting Schedule			
Week	Date	Topic	Initial Assessment
1	Mon 8/29	Introduction and precalculus review	
	Wed 8/31	2.1 The Tangent and Velocity Problems	
	Fri 9/02	2.2 The Limit of a Function	
2	Mon 9/05	<i>Labor Day</i>	
	Wed 9/07	2.3 Calculating Limits Using Limit Laws	
	Fri 9/09		
3	Mon 9/12	2.4 Continuity	2.1, 2.2, 2.3
	Wed 9/14	2.5 Limits Involving Infinity	
	Fri 9/16		
4	Mon 9/19	2.6 Derivatives and Rates of Change	2.4, 2.5
	Wed 9/21	2.7 The Derivative as a Function	
	Fri 9/23		
5	Mon 9/26	3.1 Derivatives of Polynomials and Exponential Functions	2.6, 2.7
	Wed 9/28	3.2 The Product and Quotient Rules	
	Fri 9/30	3.3 Derivatives of Trigonometric Functions	
6	Mon 10/03	<b>Exam 1 (Reassessments on 2.1 - 2.7)</b>	3.1, 3.2, 3.3
	Wed 10/05	3.4 The Chain Rule	
	Fri 10/07	3.5 Implicit Differentiation	
7	Mon 10/10	3.6 Inverse Trigonometric Functions and Their Derivatives	3.4, 3.5
	Wed 10/12	3.7 Derivatives of Logarithmic Functions	
	Fri 10/14	3.8 Rates of Change in the Natural and Social Sciences	
8	Mon 10/17	3.9 Linear Approximations and Differentials	3.6, 3.7, 3.8
	Wed 10/19	4.1 Related Rates	
	Fri 10/21		
9	Mon 10/24	<b>Exam 2 (Reassessments on 3.1 - 3.8)</b>	3.9, 4.1
	Wed 10/26	4.2 Maximum and Minimum Values	
	Fri 10/28		
10	Mon 10/31	4.3 Derivatives and the Shapes of Curves	4.2
	Wed 11/02	4.4 Graphing with Calculus and Technology	
	Fri 11/04	4.5 Indeterminate Forms and L'Hospital's Rule	
11	Mon 11/07	4.6 Optimization Problems	4.3, 4.4, 4.5
	Wed 11/09		
	Fri 11/11	4.7 Newton's Method	
12	Mon 11/14	4.8 Antiderivatives	4.6, 4.7
	Wed 11/16	5.1 Areas and Distances	
	Fri 11/18	5.2 The Definite Integral	
13	Mon 11/21	<b>Exam 3 (Reassessments on 3.9, 4.1 - 4.7)</b>	4.8, 5.1

	Wed 11/23	<i>Thanksgiving Break</i>	
	Fri 11/25		
14	Mon 11/28	5.3 Evaluating Definite Integrals	5.2
	Wed 11/30	5.4 The Fundamental Theorem of Calculus	
	Fri 12/02		
15	Mon 12/05	5.5 The Substitution Rule (not assessed)	5.3, 5.4
	Wed 12/07	6.1 More about Areas (not assessed)	
	Fri 12/09	<b>Exam 4 (Reassessments on 4.8, 5.1 - 5.4)</b>	
	Wed 12/14	<b>Final Exam (10:15 am - 12:15 pm)</b>	

*The professor reserves the right to make changes to this syllabus.*

*Last Updated August 29, 2022*