Gateway STEM High School/University of Missouri - St. Louis
2021-2022 Course Syllabus

INSTRUCTOR: Mr. Ethan Lightfoot
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CLASS WEBSITE: Calculus

COURSE NAME AND NUMBER: AC Calculus/Math 1800 Analytic Geometry and Calculus I

COURSE DESCRIPTION: Topics include limits, derivatives, related rates, Newton's method, the Mean-Value Theorem, Max-Min problems, the integral, the Fundamental Theorem of Integral Calculus, areas, volumes, and average values.

ACP ENROLLMENT: In order to receive Math 1800 credit through UMSL, each student will need to enroll through the ACP website found at `http://umsl.edu/acp`. We do this as a class before the due date of **September 1**st.

To obtain 3 hours of credit through UMSL, each student must pass this course with a "C" or above and can only receive those credits **IF** they enroll online.

This course is TOUGH. By signing up for this course, the student acknowledges that in order to obtain college credit, they will have to perform at college level. This includes having appropriate classroom behavior, completion of ALL homework assignments, and having a positive attitude about their classmates and their own learning.

PREREQUISITES: The course prerequisites are:

- Completed Gateway STEM High School AP/AC Application Form.
- 11^{th} or 12^{th} grade standing at Gateway STEM High School with an overall 3.0 or higher GPA. 11^{th} or 12^{th} graders with an overall GPA of 2.5-2.99 must provide a recommendation letter from their principal OR school counselor.
- The following academic requirements must also be met:
  - A Math ACT/ACT score of 22 **OR**
  - Math ACT/ACT score of 21 with a 3.0 GPA and completion of Algebra I and Algebra II with at least a B
  - Math ACT/ACT score of 20 with a 3.0 GPA and completion of Algebra I and Algebra II with at least a B

TEXT: The textbook this course is based on is Calculus by James Stewart, 7^{th} edition. The topics covered correspond to Chapters 1 through 5.

For this class you do not have to buy a book. The book is online and comes with your MathLabPlus registration. If you really want a physical copy of the book, I would recommend getting an old copy from Amazon.

TECHNOLOGY: This course uses a variety of technologies including many of the assignments being online only. It is imperative that if you are taking this course, that you have access to some sort of computer system which will allow you to gain online access. Throughout the course, we will make trips to the computer labs to give you time to work on assignments, but this will not be enough time for you to necessarily complete all of your assignments.

TOPICS:

Topic	**Timeline**
Limits, $\varepsilon - \delta$ definition, limit theorems, limits of trigonometric functions	4 weeks
Continuous and discontinuous functions, Intermediate value theorem.	2 weeks
Differentiation, basic theorems and formulas, derivatives of trigonometric functions, chain rule and implicit differentiation, slopes of tangent lines	6 weeks
Related rate problems, linear approximations and differentials	4 weeks
Extreme value theorem, mean value theorem, theory of maxima and minima and concavity, with examples	4 weeks
Limits at infinity and asymptotes, graphing functions using methods of calculus	4 weeks
Optimization problems and Newton's method of approximation	4 weeks
Anti-derivatives and Riemann sums. Definition of the Riemann integral and Fundamental Theorem of Calculus	2 weeks
Evaluating definite and indefinite integrals, method of substitution	4 weeks
Applications of the method of Riemann sums to finding areas between curves, finding volumes of solids including solids of revolution, work done by a force, average values of functions	2 weeks

OBJECTIVES:
Upon completion of Math 1800, the student should be able to:

- Understand the theory of limits, continuity, differentiation
- Become proficient in using the techniques of differentiation
- Obtain the ability to apply differentiation to solve related rates and optimization problems

- Understand the concept of a Riemann integral and the use of the Fundamental Theorem of Calculus to calculate Riemann integrals
- Use of the method of Riemann sums to find areas, volumes and other geometric and physical quantities
- Develop a proper writing style for solutions of mathematical problems

CLASSROOM EXPECTATIONS:

The students in Mr. Lightfoot's class are expected to:

1. *Respect the materials around you.* Show respect for the material we are learning, the materials available to the entire class, and any material you interact with. To show respect, use thoughtful and academic language, and contribute to discussions in a meaningful manner. Any disrespectful language will NOT be tolerated.
2. *Be ready to start* This means having all materials within reach and being online when class starts.
3. *Remain on task throughout the entire class time.* Class time is from the beginning of class to the end when the teacher dismisses the class. You are responsible for your own learning, so it is important to stay tuned and be ready to act throughout each class.

HOMEWORKS: Most of the homeworks in this section will be submitted through MyLabPlus, which you should have access to as a student for this course.

WARNING: You must pay close attention to the due dates of your assignments. It is YOUR responsibility to get your work done on time.

LATE WORK POLICY: Late work will be accepted throughout this course. However, late work will only be accepted up to the unit test for each unit and at a maximum of 50% of the value of the assignment. Do your homework completely and on time and you won't even have to think about this.

ACADEMIC DISHONESTY: Plagiarism is defined as presenting as one's own the words, the work, or the opinions of someone else without proper acknowledgment. Students at Gateway STEM High School are expected to complete their own work, just as they would have to in the post-secondary and professional environment. Plagiarism will result in a zero on the assignment and a referral.

EXAMS: There will be 5 exams (4 hourly exams plus a common final). No exam scores will be dropped.

The UMSL Math Department mandates that all students in Math 1800 pass a Mastery Test in differentiation. A student must take this Mastery Test, if necessary repeatedly, until

he/she can do at least 7 out of 8 basic differentiation exercises correctly. To obtain a C- or better in the course, the student must pass the Mastery Test before the last course drop date (approximately one month before the end of the semester).

As a part of you taking AP Calculus, you are REQUIRED to show up for the AP Calculus exam, on a TBDD. The teacher will let you know whenever they themselves know this date. This test is a great way to shine for potential college programs.

DATES TO REMEMBER:

Last day to drop (Semester 1): December 10, 2021
Last day to drop (Semester 2): February 11, 2022

GRADE ASSIGNMENT: Grades will be determined on the following scale: 100-90 A, 89.9-80 B, 79.9-70 C, 69.9-60 D, Below 60 F

Final grades will be determined by averaging out the semester 1 and semester 2 grades.

AC CALCULUS/MATH 1800

Course Syllabus Acknowledgement Form

Student and Parent/Legal Guardian Acknowledgement:

I have been provided with access to the course syllabus, understand what is expected of me, fully understand the course expectations and grading outline, and agree with the provision set forth in the syllabus.

This course is offered for dual credit through UMSL if your student registers online.

Student Printed Name	Date
Student Signature	Email Address
Parent Printed Name	Date
Parent Signature	Email Address

☐Check this box if you have read and understand that this course is offered for college credit and that your student must register online to receive that credit.