AP Calculus
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SY 2019-2020

Overview of Advanced Placement (AP) Calculus

AP Calculus is a year-long college-level course. The topics covered are prescribed by the College Entrance Examination Board. Students who successfully complete this course will be ready to take the national Advanced Placement Exam in May which may lead to college credit depending on the university. A graphing calculator is required for success in this course.

The course explores how limits, derivatives, indefinite integrals, and definite integrals can lead to understandings of such diverse natural phenomena such as the formation and location of rainbows, the force exerted by water on a dam, population cycles of predators and prey, and the escape velocity of a rocket.

Course Text

The primary text in this course is Dietiker, Sallee, Kysh, Hoey. *College Preparatory Mathematics Mathematics 5 Calculus*. Third Edition, Sacramento: CPM Educational Program, 2010.

This text emphasizes that true understanding requires more than one method or one way of looking at something. Students will be expected to learn concepts through numerical analysis, graphical analysis, analytic/algebraic analysis and especially verbal/ written analysis. Students will integrate these modes of analysis to build a strong conceptual framework for solving both purely mathematical as well as contextual problems. Major topics are developed over the timeframe of this entire course. For example, the fundamental theorem of calculus is explored the first day but not formally defined until half way through the year!

The CPM curriculum, as well as this class, emphasizes student-centered project based learning (PBL). Students will work in study teams to discover concepts through solving rich and project-like problems. This experience of discovering calculus will be reinforced through lecture and cornell notes, learning logs, and further projects. Students should expect to communicate and support their study team members to create solutions to problems that can be presented with clear reasoning and analytic tools.

The course will also draw on secondary texts; namely, Stewart's *Calculus Early Transcentals,* Rogawski's multiple choice practice, the release free response from previous years and *Be Prepared for the AP Calculus Exam* by Howell and Montgomery.

> **Unit 1**: Limits and Continuity
> **Unit 2**: Differentiation: Definition and Fundamental Properties
> **Unit 3**: Differentiation: Composite, Implicit, and Inverse Functions
> **Unit 4**: Contextual Applications of Differentiation
> **Unit 5**: Analytical Applications of Differentiation
> **Unit 6**: Integration and Accumulation of Change
> **Unit 7**: Differential Equations
> **Unit 8**: Applications of Integration

GRADING POLICY
Standards-Based Grading

Grade	Description			Grading Scale	
4.0	Mastered	100		**A**	**90-100**
3.5	Mastered	95-99		**B**	**80-89**
3.0	Proficient (Meets Expectations)	90-94		**C**	**70-79**
2.5	Approaching Proficient	80-89		**F**	**<70**
2.0	Basic Proficiency	70-79			
1.5	Basic with Help	65-69			
1.0	Basic with Help	60-64			
0	No skill demonstrated	50-59			

Technology Requirement
Each student is allowed to use a Texas Instruments TI83+ Graphing Calculator or similar model. The calculator is a key component of this course which will be used to explore concepts, graph functions, solve equations, explore differentiability and establish relations between data, equations and graphs.

Course Components and Expectations
Core Problems: Each section will consist of one to five core problems. These problems are absolutely necessary to discovering the ideas of algebra. These problems always require working in study teams and often require persistence in problem solving and using multiple analytic tools and strategies.

Homework: Each lesson will be followed by approximately ten problems to work on, for practice, outside of the regular class period. There will be Khan Academy videos, Delta Math, etc.

Assessments: Students will demonstrate mastery of the course goals through a variety of assessments. There will be periodic announced and unannounced quizzes. Each unit will culminate in a summative assessment. Retakes are allowed and expected to do it within a PR or as soon as possible. Don't wait until the end of a semester.

Interactive Notebook All of the above work is to be maintained. There will be periodic, announced notebook checks.

Supplies needed for class
All supplies, materials and equipment needed for students to participate in MIT Academy's educational activities shall be provided to students by the school free of charge. However, a student may obtain required materials independently, in which case they get to keep them; whereas those students who receive materials from MIT may be charged a fee for the replacement of damaged, defaced, or unreturned school supplies.
- pencils
- highlighter
- expo markers
- graph paper
- interactive notebook
- graphing calculator

Responsibility
There is much responsibility put on each of you to complete your assignments and to ask questions. In this classroom, everyone has a job to do. It is the job of the student to master the material and demonstrate this understanding by the end of the course. My job is to help you do your job. You also have a responsibility to provide an atmosphere of respect for everyone. I will make every reasonable effort to help you succeed. I look forward to a great year together!

The Key to Success
Good note taking and regular practice problems completion correlate highly with a successful student. In other words, when a student takes notes and practice classwork/homework problems, he or she will be successful in this class. **AIM HIGH!**

Studying for the AP Examination (10 days)
The course is paced to allow three weeks of review. Students will:
- Review of Chapter Topics through study of learning logs
- Practice Multiple Choice Questions both individually and in groups
- Practice Free Response Questions both individually and in groups
- Mock AP Exam – Multiple Choice and Free Response
- Strategies for Success
- Mock Grading Sessions; emphasis on how to use analytic, geometric and graphical mathematics to support a problem's solution
- Graphing calculator review; when to use and when not to use

AP Calculus Examination (1 day)

Post AP Examination (15 days)
Students complete a variety of independent projects which range from creating calculus tutorials to post online to exploring topics in the history of mathematics.

Course: AP Calculus   **Teacher:** Lumanlas

I have read the course syllabus, and I have shared its contents with my parents. Furthermore, I am aware of the grading policy that will form the basis of my evaluation and how my grade will be computed. I am aware that homework is an extension of the regular classwork, and will be counted as a part of my overall evaluation. I realized that I am required to maintain a binder containing all notes, classwork, homework, and other assignments.

_____ I have read the expectations, and I am aware of what is expected of me to successfully complete this class.

Student Signature: _____

Parental support is requested to make sure that all assignments are completed and turned in on time. Parents are also asked to sign below, indicating that they have read this sheet and the course syllabus.

Child's Name: _____ Class Period: _____
Date: _____

_____ I have read the expectations, and I am aware of what is expected of my child to successfully complete this course.

_____ I have read the expectations, and I would like to discuss them further.

Parent(s) Name & Signature _____
Contact number/s _____
Email _____