
FUNCTIONS, MODELING, PRECALC in Fall 2020 (MA1025)

Course Code	MA1025	Professor(s)	Taylor Coffman
Prerequisites	None	Office Number	PL (1st Floor)
Class Schedule	MWR: 12:40-14:15 in SD-1	Office Hours	Teams office hours, or by appointment
Credits	4	Email	tcoffman@aup.edu
Semester	Fall 2020	Office Tel. Ext.	

Course Description

Functions with Modeling, MA1025, is designed to provide students the additional algebraic and geometric skills that they need in order to follow with success a university calculus course - much like a precalculus course. MA1025 also develops skills in constructing, using, and interpreting mathematical models.

You will investigate and explore the properties of the following types of functions: linear, polynomial, rational, radical, exponential, and logarithmic. You will learn to sketch graphs and solve equations and inequalities involving the above functions. You will also become fluent in understanding and using function notation, in the notions of slope, change, and interpreting graphs. Applications are drawn from economics, business, finance, science, the environment, psychology, etc.

An additional objective this semester is to develop a positive attitude and appreciation towards mathematics and quantitative reasoning in general. I do not necessarily expect you to come away with a new-found love of math, but I do certainly hope you will come away knowing that these topics do exist and that they do have a purpose in the lives of many people, even yours. Ask all of the questions that you have and let's work together to see how the ideas discussed can have an impact in your life.

An outline of specific topics can be found below.

Course Learning Outcomes

Develop a positive approach to mathematics.

Appreciate the use of mathematics in modeling the world.

Reason with quantitative information – in words, numbers and graphs and charts.

Clearly communicate quantitative information in words, in numbers and with graphs.

Develop strategies for solving problems.
Understand functions by both algebraic and geometric approaches.
Understand linear, exponential and polynomial functions in depth.
Be able to use computers to construct models of real-world situations using functions.
Communicate clearly and concisely, both in writing and speaking.

General Education

This course can be used towards the *Quantitative Reasoning* Global Liberal Arts Core Curriculum (GLACC) requirement and as such has the following learning objectives:

- Develop a positive approach to mathematics
- Appreciate the use of mathematics in modeling the world
- Reason with quantitative information – in words, numbers, and graphs
- Clearly communicate quantitative information in words, numbers and with graphs
- Develop strategies for solving problems

Course Outline

1. Algebra Review
 1. Working with fractions
 2. Order of operations
 3. Properties of real numbers
 4. Variables and variable expressions
 5. Simplifying and evaluating variable expressions
 6. Solving equations
 7. Exponent rules
2. Functions
 1. General definition
 2. Function notation
 3. Representing functions
 4. Domain and range
 5. Average rate of change
 6. Composition of functions

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7. Transformations of functions
 8. Absolute value functions
 9. Inverse functions
3. Linear Functions
 1. Linear functions and their graphs
 2. Slope
 3. Slope-intercept and point-slope equations of a line
 4. Solving linear equations
 5. Systems of linear equations
 6. Matrices
 7. Linear models and linear programming
 4. Polynomial and Rational Functions
 1. Quadratic functions
 2. Polynomial functions
 3. Graphs
 4. End behavior
 5. Dividing polynomials
 6. Zeros of polynomial functions
 7. Rational functions
 8. Asymptotes and removable discontinuities
 5. Exponential and Logarithmic Functions
 1. Exponential functions and their graphs
 2. Logarithmic functions and their graphs
 3. Properties of logarithms
 4. Exponential and logarithmic equations
 5. Exponential models

Note: Each of the above subtopics has its own list of objectives. Thus, the above list only provides a layout and a direction of the class discussions. The class meetings will dive significantly deeper into each topic.

Textbooks

This course doesn't have any textbook.

Attendance Policy

For students physically present on campus:

The attendance policy is as follows: You have a “buffer” of 8 absences. This includes excused school absences, sick days, immigration appointments, scheduling conflicts, sleep in, don’t want to come, etc. If you surpass the 8 absences, each additional absence will be 1 full percentage point off your final semester grade.

For example, if you finish the semester with a 92% but have 12 absences, then you will end the semester with an 88%. Please be careful with this.

Of course, absences due to anything related to Covid will not count towards this 8 absence “buffer”. However, Covid related absences will require documentation. Send any documentation to me via Teams, and check in with me on Teams for each class attended remotely.

For students remotely present:

The attendance policy is as follows: You have a virtual “buffer” of 8 absences. What does being remotely present include?

- You join the “live” class via Teams. No further action is required on your part.
- If you cannot join the “live” class via Teams, you will have to watch the posted class video and any other supporting material (articles, textbook excerpts, video links, etc.) and check in with me on Teams for each class meeting attended remotely. Communication on Teams is quicker and more informal than email, so checking in with me will basically be the equivalent of sending a few text messages or having a quick video chat.

If you do not do one of the two bullet points above, you will be considered “virtually absent”. If you surpass the 8 absences, each additional absence will be 1 full percentage point off your final semester grade.

For example, if you finish the semester with a 92% but have 12 absences, then you will end the semester with an 88%. Please be careful with this.

A final note about attendance:

It is not my intention to punish, or be harsh, with the aforementioned attendance policy. My goal is to ensure that all students stay on track with what's happening in class and that no student falls through the cracks.

Covid-19 temporary amendments

Students studying at The American University of Paris are still expected to attend ALL scheduled classes. Due to the Covid-19 pandemic, students will have the option of attending classes remotely when special circumstances apply. For example, when students are placed

under quarantine by the French authorities or by their doctor, or when students present symptoms of Covid-19 and are directed, by their doctor or the AUP Health Office, to remain home. It is still the student's responsibility to be aware of any specific attendance policy that their professor might have set in the course syllabus. In particular, Students attending remotely from distant Time Zones should check with their professors about the specific attendance policy for remote learners.

Grading Policy

Grade Breakdown

Homework: 40%

Quizzes: 15%

Midterm: 20%

Final Exam: 25%

Homework

We learn math by doing math. Homework plays a big role in this class – 40% is significant so keep up with the assignments.

Homework in this class will take place within the WebAssign online platform. Each week I will post the assignments to be worked on and completed during that week. That is, you have one week to complete the assignments. WebAssign will automatically grade your submitted answers. However, you have an unlimited amount of submissions. So while you are being graded on performance, you are encouraged to fix and learn from your mistakes by resubmitting problems you may initially struggle with.

You need to work through the homework sections in order, and you cannot move on to the next homework section until you obtain a 50% on the previous homework section.

During the first day of class, I will demonstrate how to sign up for and access WebAssign and how to find your way around the online environment.

Other

Technology

- Webassign: homework, grades
- Teams: private messages, class messages, announcements, links, pdfs, syllabus, etc.

Textbook

OpenStax Precalculus

The book listed above is free of charge (yes, FREE \$0) and can be downloaded or viewed online from the following site:

<https://openstaxcollege.org/subjects/math>