AMERICAN UNIVERSITY

MATH 170 PRECALCULUS

SUMMER 2020 (ONLINE)

SYLLABUS

Instructor : J Dickens, PhD

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Office Hours : Mondays : 5:30pm – 8:30pm (and upon personal request by email)

Course Materials: Functions Modeling Change by Connally, Hughes-Hallett, Gleason et al, 5th edition

Course Description

This course as indicated above is being offered **asynchronously** online. We will make use of a variety of electronic and internet based instructional assets to help foster learning and understanding. Of course, the required text will be used, but also teacher made videos (through blackboard and Kaltura), teacher selected you tube videos along with visual tools from other internet sources as will be featured in order to provide a robust and interesting Pre-Calculus educational experience. Depending on everyone’s computer operating capacity we may use the language Python in order to explore and execute certain mathematical ideas, concepts and procedures.

Of course, Pre-Calculus is designed to equip students with the required academic tools to succeed in Calculus; and this will be a primary objective. We will, however, take advantage of the stand alone benefits that the course content provides for general and generic academic growth and advancement.

Specifically, we will study common families of functions of a single variable – exponential, logarithmic, trigonometric, quadratic, polynomial and rational functions. Our approach to understanding these families of functions will be application based. For example, the changing price of a product based on demand for the product or measuring the changing population of a country over time, or the fluctuations in an organism’s body temperature throughout the course of a day. The core of the content material is comprised of the following four units.

* Functions and Their Graphs (Chapters 1, 2, 6 and 10) **(Weeks 1-2)**
* Exponential, Logarithmic, and Power Functions (Chapters 4, 5, and 11) **(Weeks 2-3)**
* Trigonometric Functions (Chapters 7, 8, and 9) **(Weeks 4 – 5)**
* Polynomial and Rational functions (Chapters 3, and 11) **(Weeks 5 – 6)**

Additional topics will be covered if time permits.

Learning Outcomes

The goal of this course is to provide students with the necessary tools for taking more advanced courses in quantitative reasoning. After completing this course, students should be able to:

* Recognize and describe the basic properties of functions from data tables, graphs, formulas and descriptions of relationships between two different quantities.
* Analyze and interpret expressions written with function notation, use function notation to express mathematical concepts, and recognize and create new functions using transformations, compositions and inverses.
* Develop and analyze appropriate models, for information given in the form of a graph, diagram, or description of some real-world phenomena, using families of functions mentioned earlier.

Students will also develop more general skills, Including:

* Computation – This is not the main focus of the course, but it can present a significant hurdle to students in any quantitative course. Algebra can be tricky, so you will have the opportunity to increase your comfort level with mathematical computations.
* Critical Thinking – In the past, you may have taken a math class where the questions you were asked were very similar to questions that had already been answered. While this may happen from time to time in this course, for the most part, you will routinely encounter questions that are unfamiliar. You will practice analyzing the problem conceptually, testing and weeding out wrong approaches in order to find a reasonable one, and figuring out how to move forward when you are stuck.
* Communicating Mathematics – You will have the opportunity to improve your proficiency in talking and writing about mathematics, including analysis of trends in data, the reasoning behind a choice of a model, and the predicting capacity of such models. These are skills that will prove useful in many other subjects.
* Confidence – Notice that this says confidence and not correctness. An important part of mathematics is being wrong. We expect you to be wrong many times this semester – and that is a good thing! Struggling with a concept or through a problem is an important part of the learning process. It is important that we are open about this process. Asking good questions, discussing where you are stuck, and explaining your reasoning all are critical to building confidence in your understanding of mathematical concepts.

Course Policies

Although the online experience is different from the all familiar face to face model for teaching and learning, the focus, however, remains to be *problem-based learning*. These problems will be used to motivate theory and methods, rather than having procedures simply presented in class and followed by students. Classes will also involve cooperative learning. Students can contact each other electronically and trade ideas and strategies need to successfully problem solve. This approach will help you to learn from one another and improve your communication and reasoning skills.

Grading Policies and Procedures

Assignment grade weights

**Exams**

There will be three exams. Each exam will carry a weight of 20% individually. Hence exams collectively constitute 60% of your grade. No student collaboration is permitted on Exams

**Written Homework**

There will be 3 to 4 major written homework assignments that feature problems solving. Collectively the written homework assignments account for 20% of your grade. Collaboration is encouraged for Written Homework assignments. In fact, student teams of two to three will be formed to prepare and submit Written Homework assignments for credit.

**Quizzes / Classwork**

An assortment of short quizzes and classwork will be assigned that will feature essential critical skill development needed to explore and navigate through linked problem solving tasks and more challenging procedural methods. For quizzes, you are expected to work on independently, only seeking help if you are hopelessly stuck. For classwork assignments you may and are encouraged to collaborate with other students. Quizzes coupled with Classwork assignments constitute 15% of your grade for the course.

**Online Homework**

Assigned online worked through blackboard will account for 5% of your final course grade. Normally multiple attempts are allowed as you answer questions for online work. (If no online homework is assigned, the 5% weight will be added to the weight for Quizzes/Classwork)

**Letter Grade Assignment Weights**

100 – 95 A 94 – 89 A- 88 – 85 B+ 84 – 80 B 79 – 75 C+ 74 – 70 C

69 – 60 D 59 – 0 F

**Late work policy**

Generally, late work is not excepted without **written evidence** of a medical or family emergency. The **written evidence** must come from a university official. If a late assignment is accepted by the teacher absent of **written evidence** of an emergency, there is a 25% penalty. (The highest grade that you can get on an assignment that is late is 75%)

Assignment grades / scores will be available on blackboard for student viewing during the semester. Students can always email me if you want to know your academic standing in the class.

University Policies and Support Services

* **American University’s Academic Integrity Code** – All work submitted for the course must be your own work. If you work with a classmate on a homework assignment, please indicate this on the assignment. No collaborating is allowed on exams. For written assignments in particular, there are websites (e.g. Chegg, Cheat At Math Homework,…) which allow you to post questions and receive answers. The use of such services is not allowed and violates the Academic Integrity Code. Your professor is required to report cases of academic dishonesty to the dean of the College of Arts and Sciences. The baseline consequence of an AIC infraction is failure for the course! Please read the University’s integrity code carefully and talk to your professor if you have questions. The code can be found at <http://www.american.edu/academics/integrity/>.
* **Emergency Preparedness** - In the event of a declared emergency, including inclement weather, students should refer to the website <http://www.american.edu/emergency> and the information line at 202-885-1100 for general university wide information. Information specific to this course during a prolonged closure of the university will be posted on Blackboard.
* **Math and Stat Tutoring Lab** (DMITI 103) Students can get limited help with homework at the Tutoring Lab, no appointment necessary. The hours of the lab are Monday-Thursday 11am-8pm, Friday 11am-3pm and Sunday 3pm-8pm. Always attempt a problem on your own before seeking out help at the tutoring lab ! (Now that we are online, check with your professor regarding possible schedule and arrangement changes for tutoring)
* **Academic Support and Access Center (ASAC)** (MGC 243, [asac@american.edu](mailto:asac@american.edu)) ALL students may take advantage of ASAC for FREE! They offer individual academic skills, counseling, workshops, ASAC Tutoring and Writing Lab appointments, peer tutor referrals, and supplemental instruction.

***If you wish to receive accommodations for a disability, you must notify your professor with a letter from ASAC. As accommodations are not retroactive, timely notification at the beginning of the semester, is strongly recommended.***

Important Summer Sessions 2020 Dates and Events

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| Date | Day | Event |
| **5/18/2020** | **Monday** | **First 6 - Week (B) session begins** |
| 5/25/2020 | Monday | Memorial Day; no classes; university offices are closed |
| 6/1/2020 | Monday | Payment due for summer classes |
| 6/1/2020 | Monday | Last day to apply for summer graduation |
| **6/27/2020** | **Saturday** | **First 6 - Week (B) session ends** |
| 6/29/2020 | Monday | Second 6 – Week (D) session begins |
| 8/82020 | Saturday | Second 6 – Week (D) session ends |

The dates and events indicated above are mostly applicable to this class. For a more comprehensive list of dates and events for all students, please view the 2020 Summer Sessions Dates and Events for American University that are posted online.