PRECALCULUS
MATH 1650.622
FALL 2020

Instructor: Dr. J. Iaia
Office: GAB 420
Office Hours: on Zoom MWF 11-1, or by appt.
Homework assignments are online in "canvas"

Time: M-F 10:00-10:50
Place: on Zoom ID # 975-9953-4080
email: iaia@unt.edu

Text: J. Stewart, L. Redlin, S. Watson, *Precalculus: Mathematics for Calculus, 6th ed.*

GRADING POLICY

Exam 1	$16\frac{2}{3}\%$	*Thursday Sept.* 17, 9:30-10:50
Exam 2	$16\frac{2}{3}\%$	*Thursday Oct.* 15, 9:30-10:50
Exam 3	$16\frac{2}{3}\%$	*Thursday Nov.* 12, 9:30-10:50
Project	$16\frac{2}{3}\%$	*Tuesday Nov.* 24
Homework	$16\frac{2}{3}\%$	2 *times per week*
Final Exam	$16\frac{2}{3}\%$	*Saturday Dec* 5, 8-10 am

Exams: Exams **must** be taken on the dates listed above. Exceptions will be considered *only* if one has **written documentation** certifying one's absence.

Homework: Homework will be assigned each class and collected 2 times a week. Five problems will be chosen at random and graded. Homework is extremely important and students are highly encouraged to spend a lot of time working on the homework problems.

Attendance: Students are required to attend class.

Code of Conduct: Students are expected to be *respectful of others* at all times. This includes keeping talk and other noise to a minimum while a lecture is in progress or an exam is being taken. Any student being disruptive may be dismissed from the class meeting. **Cheating** will **not** be tolerated and anyone found guilty of cheating may receive an F for the semester.

Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in feedback from students, as I work to continually improve my teaching. I consider the SPOT to be an important part of your participation in this class.

Students with disabilities: It is the responsibility of students with disabilities to provide the instructor with appropriate documentation from the Dean of Students Office.

Semester grades are determined by averaging the grades on the 3 exams, the final exam,the project, and the homework. Letter grades will be based on this average and will follow this scheme:

A 90- ;B 80-89; C 70-79; D 60-69; F -59

Class Recordings & Student Likenesses: Synchronous (live) sessions in this course will be recorded for students enrolled in this class section to refer to throughout the semester. Class recordings are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.

Class Materials for Remote Instruction: The UNT fall schedule requires this course to have fully remote instruction in the Fall of 2020. Additional remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to a webcam and microphone. Information on how to be successful in a remote learning environment can be found at https://online.unt.edu/learn.

Course Description

This course is to prepare students for calculus. First we will discuss the principal of mathematical induction and use it to prove some well-known formulas. Next we will discuss polynomials, rational functions, and their graphs. We will also discuss exponential and logarithmic functions and their graphs. We will discuss trigonometry of the right triangle and the trig functions. Students will also learn the value of the trig functions at common angles. We will become familiar with the graphs of the trig functions and the inverse trig functions. We will solve equations involving trig functions. We will also learn about the law of sines and the law of cosines and see how we can use these to solve triangles. We will learn the addition and subtraction formulas as well as the double angle and half angle formulas. We will learn how to solve trigonometric equations. Next we will discuss polar coordinates and the graphs of polar equations. We will also discuss the polar form of complex numbers. We will next discuss arithmetic and geometric sequences. Near the end of the semester we will talk about vectors in two and three dimensions as well as the dot product and cross product of vectors and their geometric significance.

Course Objectives

At the end of the semester the student should be able to prove basic formulas by mathematical induction. The student should know how to sketch the graphs of polynomials and rational functions. The student should also know how to find the zeros of polynomials. The student should be familiar with the graphs of exponential and logarithmic functions and how to solve equations containing them. The student should know the definition of the six trig functions and the sketch of the graph of each of these. The student should be able to prove various trig identities as well as be familiar with how to apply and use the double angle and half angle formulas. The student should also know how to solve various trig equations. The student should be familiar with polar coordinates and how to graph a function written in polar form. The student should also know if a sequence is arithmetic or geometric. Finally, the student should be familiar with vectors in two and three dimensions and how to find their lengths and the angle between them.

Course Outline

Meeting 1 - mathematical induction

Meeting 2 - induction

Meeting 3 - induction

Meeting 4 - induction problems with inequalities

Meeting 5 - induction problems with inequalities

Meeting 6 - polynomials

Meeting 7 - zeros of polynomials

Meeting 8 - synthetic division and long division of polynomials

Meeting 9 - graphs of polynomials

Meeting 10 - rational functions

Meeting 11 - graphs of rational functions and their asymptotes

Meeting 12 - graphs of rational functions and their asymptotes

Meeting 13 - graphs of rational functions and their asymptotes

Meeting 14 - exponential functions

Meeting 15 - logarithmic functions

Meeting 16 - logarithmic functions

Meeting 17 - review for exam 1

Meeting 18 - Exam 1

Meeting 19 - graphs of exponentials and logarithms

Meeting 20 - solving exponential and logarithmic equations

Meeting 21 - definition of trigonometric functions

Meeting 22 - extension of trig functions to all angles

Meeting 23 - table of well-known values of trig functions

Meeting 24 - graphs of trig functions

Meeting 25 - more on graphs of trig functions

Meeting 26 - more on graphs of trig functions

Meeting 27 - more on graphs of trig functions

Meeting 28 - inverse trig functions

Meeting 29 - more on inverse trig functions

Meeting 30 - law of sines

Meeting 31 - law of sines - the ambiguous case

Meeting 32 - law of cosines

Meeting 33 - solving triangles

Meeting 34 - trig identities

Meeting 35 - more on trig identities

Meeting 36 - more on trig identities

Meeting 37 - more on trig identities

Meeting 38 - review for exam 2

Meeting 39 - Exam 2

Meeting 40 - addition and subtraction formulas

Meeting 41 - double angle and half angle formulas

Meeting 42 - trigonometric equations

Meeting 43 - more on trigonometric equations

Meeting 44 - more on trigonometric equations

Meeting 45 - polar coordinates

Meeting 46 - graphs of polar equations

Meeting 47 - graphs of polar equations

Meeting 48- polar form of complex numbers

Meeting 49 - arithmetic sequences

Meeting 50 - geometric sequences

Meeting 51 - more on geometric sequences

Meeting 52 - binomial theorem

Meeting 53 - vectors

Meeting 54 - dot product of vectors

Meeting 55 - length of vectors

Meeting 56 - angles between vectors

Meeting 57 - review for exam 3

Meeting 58 - Exam 3

Meeting 59 - cross product of vectors in three dimensions

Meeting 60 - cross product of vectors in three dimensions

Meeting 61 - cross product of vectors in three dimensions

Meeting 62 - equations of lines in three dimensions

Meeting 63 - equations of planes in three dimensions

Meeting 64 - topics that come up on the project

Meeting 65 - more topics that come up on the project

Meeting 66 - more topics that come up on the project

Meeting 67 - final comments about precalculus

Meeting 68 - preview of calculus

Meeting 69 - review for final exam

Meeting 70 - review for final exam

Meeting 71 - review for final exam

Meeting 72 - review for final exam

Meeting 73 - Final Exam