Summer 2021 Precalculus Syllabus

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CONTACT

Dr. Sheng Xu, 214-600-3080**,** meimei.shengxu@gmail.com

COURSE DESCRIPTION

Precalculus is a preparation course for calculus. The theme of the course is functions. Students will learn definitions, properties, graphs, and manipulation techniques of polynomial, rational, exponential, logarithmic, trigonometric functions, and their combinations. Analytical geometry and series will also be covered. These topics will prepare students for differentiation and integration of functions, differential geometry and series representation of functions in calculus.

Textbooks:

- **[1]** Dr. Xu's lecture and review notes: crafted with references to different resources; ready before each class in the Google classroom
- **[2]** Ron Larson et al., Precalculus With Limits: A Graphing Approach (Advanced Placement Version), 4 th Edition

References:

- **[3]** E.W. Swokowski & J.A. Cole, Precalculus Functions and Graphs, Edition 12e
- **[4]** R. Rusczyk, Art of Problem Solving: Precalculus, 2 nd Edition
- **[5]** R. Rusczyk and M. Crawford, Art of Problem Solving: Intermediate Algebra

WHEN AND WHERE?

Term: May 31 – Aug. 15 (excluding July 4-10 week)
Lecture: 7-9pm (CT), Mon. & Thu.
Homework Recitation: 5:30-6:30pm (CT), Wed. & Sun.
Format:

- 20 2-hour online zoom lectures + 20 1-hour online zoom recitations
- 20 homework assignments (1 after each lecture) + 4 take-home exams

TENTATIVE SCHEDULE

Lecture	Main Topics
1	Series; Mathematical induction
2	Binomial theorem; Permutations and combinations
3	Coordinate systems; Graphs of equations
4	Functions: definition, graphs, operations
5	Quadratic functions; Polynomial functions
	Exam 1
6	Long division; Synthetic division; Zeros of polynomials
7	Complex zeros of polynomials; Rational functions
8	Inverse function; Exponential and logarithmic functions
9	Laws of exponents and logarithms; Exponential and logarithmic equations
10	Systems of linear and nonlinear equations
	Exam 2
11	Angles; Trigonometric functions of angles
12	Trigonometric functions: values, graphs and properties
13	Application of trigonometric functions
14	Trigonometric identities and equations
15	Trigonometric formulas: Addition, subtraction, multiple-angle; product-to-sum; sum-to-product
	Exam 3
16	Inverse trigonometric functions; Laws of sines and cosines
17	Vectors; Dot product; De Moivre’s theorem
18	Parabolas; Ellipses; Hyperbolas
19	Plane curves; Parametric equations; Polar coordinates
20	Polar equations of conics
	Exam 4