

Math 140 – Precalculus: Trigonometry and Analytic Geometry (3)

Studies trigonometric functions, analytic geometry, polar coordinates, and related topics. This course is the second part of the precalculus sequence. Credit allowed for at most one of 134, 135, or 140.

Pre: 134, 135 or 161 or placement exam.

Text: Stewart, Redlin, Watson, *Precalculus Math 140*, (Fifth Edition).

a. Fundamentals (2 hours)

Text: Chapter 1, Sections 4, 5, 7, 8, 10

Interval notation, completing the square, quadratic formula, solving inequalities, absolute value inequalities.

b. Functions (3 hours)

Text: Chapter 2.

Functions, domain, range, graph, sums, products and quotients of functions, composites of functions and inverse functions.

c. Polynomial and Rational Functions (4 hours)

Text: Chapter 3, Sections 1, 2, 3, 6.

Polynomial functions, rational functions, graphing, intercepts, asymptotes, and changes in sign. Section (3.3), Applications, should be emphasized.

d. Exponential and Logarithmic Functions (3 hours)

Text: Chapter 4.

The function $y = b^x$, $b > 0$, the number e , the function $y = e^x$ the inverse of $y = b^x$ is the function $y = \log_b x$, the function $y = \ln x$, the properties of logarithms and the change of base formula. The last half of Section 4.5 is optional.

e. Trigonometric Functions of Real Numbers (3 hours)

Text: Chapter 5.

The trigonometric functions of real numbers, Pythagorean identities, opposite angle identities, period, amplitude, the graphs of $y = \sin x$ and $y = \cos x$, the graphs of $y = A \sin(Bx \pm C)$

and $y = A \cos(Bx \pm C)$, and the graph of $y = \tan x$. You may give the graphs of cotangent, secant, cosecant of Section 5.4 as a reading assignment or have your T.A. present it.

f. Trigonometric Functions of Angles (4 hours)

Text: Chapter 6

Degree and radian measure, formula for arc length, angular and linear speed, trigonometric functions of angles in standard position, evaluating trigonometric functions, reference angles, basic identities and right angle trigonometry, Law of Sines, Law of Cosines.

g. Analytical Trigonometry (4 hours)

Text: Chapter 7.

Trigonometric identities, addition formulas for sine, cosine and tangent, double angle formulas, half-angle formulas, product-to-sum and sum-to-product formulas, trigonometric equations and inverse trigonometric functions.

h. Polar Coordinates (1 hours)

Text: Chapter 8, Section 1.

Polar coordinates.

i. Analytical Geometry (3 hours)

Text: Chapter 10, Sections 1, 2, 4 and 5.

The focus-directrix definition of the parabola, and the definitions of the ellipse and the hyperbola in terms of foci. Of principal concern is that students can identify the equations of and graph parabolas, ellipses, and hyperbolas with axes parallel to the x and y axes. If time runs out, skip parabolas which are covered earlier.

Course Objectives and Student Learning Outcomes. Upon successful completion of Math 140, the student will be able to work with, apply, and answer questions pertaining to the material in the list of topics at the level of a standard “Precalculus” text.

Program Objectives. The successful student will acquire the skills prerequisite to “Calculus”.