

Syllabus: **MAT 142** TRIGONOMETRY (PRECALCULUS II)

Goals: To learn some fundamental concepts about functions, some techniques for applying the concepts, and to strengthen the student's foundation for learning calculus; and to transfer knowledge gained to formulating and solving problems. The language of mathematics is powerful; a major thrust of this course is to help you build your ability to communicate mathematical ideas.

A graphing calculator is required. (The **TI-84** or **TI-84 Plus** is recommended.)

Course Outline

1 [3 weeks]

- (a) Angles in standard position; angle measures (revolutions, degrees and radians); arc length
- (b) Trigonometric functions of angles defined in terms of the unit circle;
- (c) Domain, range, period; signs, even-odd properties;
Fundamental Identities
- (d) Graphs of sine and cosine functions;
Amplitude, period and phase-shift;
Sinusoidal curve fitting;
Informal investigation of slope function of a sine curve, including how rate of change of slope affects concavity of graph
Graphs of other trigonometric functions;

2 [5 weeks]

- (a) Trigonometric Identities, including the Pythagorean identities, Sum, Difference, Double and Half Angle Formulas. Emphasis on students' proofs of identities based on definitions and prior results.
- (b) Inverse Trigonometric Functions and their graphs
- (c) Solution of trigonometric equations
- (d) Exploring behavior of trigonometric and other functions (end behavior and behavior near a break in domain) as foundation for limit concepts

3. [3 weeks]

- (a) Right Triangle trigonometry
- (b) Law of Sines; Law of Cosines; Area of a Triangle
- (c) Polar Coordinates, Graphs and Equations
- (d) The Complex Plane; DeMoivre's Theorem
- (e) Optimization problems involving trigonometric and other functions (speed of light in water experiment)

4 [3 weeks]

- (a) Sequences; Pattern and Recursion Formulas; Summation Notation;
(Annuities, Amortization and Mortgage Payments)
- (b) Arithmetic and Geometric Sequences; Series
- (c) Apparent limits of infinite sequences and series
- (d) Mathematical Induction Theorem
- (e) Binomial Theorem

Homework: For every lesson, problems will be assigned that you will either discuss or hand in. Class will proceed on the assumption that you have done and understood these problems. You are responsible for asking questions, and these should be based on your own serious efforts to solve the problems. Visit your professor in office hours if you find you have additional questions not fully answered during class.

Regular and on-time attendance in this class is imperative because much of your learning will develop through class activities and discourse.

Quizzes: There will be frequent quizzes, often in the first 15 minutes of class. Missed quizzes cannot be made up. Your 2 lowest quiz grades will be dropped at the end of the semester.

Exams: There will be two hour-exams and a Final Examination. Excuses for missed exams will not be accepted unless accompanied by a doctor's note or similar official document.

All assignments must be submitted on time.

Grading:

Points will be assigned on the following basis:

Exam 1	200
Exam 2	200
Homework and other written assignments	200
Quizzes	100
Final exam	300
<i>Total</i>	<i>1000</i>

Academic integrity: No collaboration is permitted on quizzes and examinations. Please refer to UVI's student handbook for the policy on academic honesty, and remember that no grade is worth the sacrifice of your academic reputation.