Text: "Functions, Trigonometry, and Their Applications", version 2.0, by Dan Raies – this version is in print starting winter 2017

Technology: If you require a graphing calculator, use it and recommend a TI-84, TI-83 Plus or TI-83. If you do not allow the use of a calculator, be prepared to a) not use one yourself (lest ye be accused of hypocrisy) and b) write exams so that the simplification of arithmetically complex problems does not overshadow the actual concept they are being tested on.

Course Goals: A student successfully completing the course should, in general, have a foundation in core algebraic facility as well as conceptual and computation understanding of functions. The student can model the mathematical topics described among the learning outcomes in words, then solve or simplify the relevant equations and/or expressions, and finally write a summary statement of the solution. In short, all of the learning outcomes should be incorporated with skill at mathematical modeling.

If you're open to it, free and/or browser-based programs like Wolfram|Alpha can be of tremendous use to you and to students.

Learning Outcomes: A successful student can...

- identify, by formula, verbal description, or graph the vertical and horizontal transformations that take a parent function to an indicated function
- identify a function as periodic from its definition
- describe characteristics of periodic functions such as period, as well as amplitude and midline where applicable
- describe the sine, cosine, and tangent functions from both unit circle and right triangle perspectives
- describe the characteristics of the sine, cosine, and tangent as functions
- calculate all angles and side lengths of both right and oblique triangles, given appropriate information
- compute using both degrees and radians as measures of angles
- use identities relating to the period of sine, cosine, tangent as well as identities relating to negative angles and the Pythagorean Identity
- construct functional models from trigonometric, exponential, polynomial and rational expressions
- describe vectors in a mathematical and physical science context
- add, subtract, and perform scalar multiplication on vectors
- find and interpret the dot product of two vectors as a measure of agreement between vectors

Textbook Change Log from Version 1.0:

- Content on inverses, composition, and arithmetic of functions was removed.
- Chapter 5 in Version 1.0 is Chapter 4 in Version 2.0.
- Chapter 4 in Version 1.0 is Chapter 3 in Version 2.0.
- Section 2.4 in Version 1.0 is Section 1.6 in Version 2.0.

- In Section 2.6, inverse functions are covered in their entirety (now Section 3.3 gives no new definitions for inverse trigonometric functions).
- Every section has two homework assignments. The answers to Homework Assignment B are in the appendix and problems with the same number (between A and B) should be similar.

A Rough Schedule of Content: This should be viewed as a tentative schedule for discussing content. With as many as 40 contact hours total for the course, and less than 30 hours of content outlined in the schedule, there should regularly be time to do homework questions, assessments (e.g. quizzes, exams), review and in-class student work.

Week	Sections to Cover	Notes
1	1.1 (0.5 hrs), 1.2 (1.5 hrs), 1.3 (1.5 hrs)	
2	1.4 (2 hrs), 1.5 (1 hr)	In 1.4, combinations of horizontal transformations are tricky and often non-intuitive for students; Section 1.5 could be taught anywhere in Chapter 1 (e.g. between 1.3 and 1.4)
3	1.6 (2 hrs), 2.1 (1 hr)	
4	2.2 (1.5 hrs), 2.3 (1 hr), 2.4 (1.5 hrs)	Section 2.2 introduces sine and cosine from the unit circle definition, but addresses right triangles too; Section 2.4 is graphs of the form $A\sin(\theta)+k$ and $A\cos(\theta)+k$
5	2.5 (1 hr), 2.6 (2 hrs)	
6	3.1 (1.5 hrs), 3.2 (2.5 hrs)	Section 3.1 is essentially a treatment of Chapter 2 but revisiting with radians
7	3.3 (2 hrs) , 3.4 (2.5 hrs)	Section 3.4 is a full treatment of transformations on $\sin(\theta)$ and $\cos(\theta)$.
8	3.5 (0-3 hrs), 4.1 (2 hrs), 4.2 (2 hrs)	Section 3.5 contains optional topics; vectors are defined by direction and magnitude (no components yet).
9	4.3 (2 hrs), 4.4 (2 hrs)	This text uses $x\vec{i}+y\vec{j}$ instead of (x,y) in Section 4.2.
10	4.5 (1 day), Catch-up, Review	
11	Final Exam	Finals exam week; No classes; **Final exam** at scheduled time `http://registrar.uoregon.edu/calendars/final_exam?schedule=2016-2017`

Additional Notes:

- It is extremely important that the students know that Math 112 is a precalculus course. It is designed for students who have an understanding of college algebra content that is to be built upon in order to prepare them for calculus. Not all students fit this description, but nevertheless it is the assumption. less than 5% of the students will go on to degrees in mathematics, and that the majority need a solid conceptual understanding of the topics in a scientific context.
- Common areas of difficulty: Basic algebra (factoring, simplifying and operations on fractions), horizontal transformations, completing the square, applications of any sort. Be conscious of these facts when you approach each topic so that you can be ready for the confused looks, frustrated sighs, and eye rolling. Combat them with detailed examples and ample opportunities for practice.

Basic algebra review is most effective when integrated into new concepts, so do it on an as-needed basis.

Other Important Dates
(`http://registrar.uoregon.edu/calendars/academic?period=Fall%202013&ts=Fall%202015`):

Monday of 2nd week Last day to drop without a W (but only 75% tuition refund)
Wednesday of 2nd week Last day to add a class
Sunday after 7th week Last day to drop — period!