

Math 112 Trigonometry - Summer 2019
Course Syllabus

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Office Hours: By appointment

Course Description: Trigonometric functions, inverse trigonometric functions, trigonometric identities and conditional equations, solving triangles, polar coordinates, complex numbers, and analytic geometry. Prerequisite: MATH111 or equivalent

Online Textbook: College Algebra and Trigonometry by OpenStax
ISBN: 978-1-947172-10-4

Calculator: Access to a graphing calculator is required.

Academic Services: BLC provides free tutoring. You can make arrangements through the Academic Resource Center, <http://www.blc.edu/academic-resource-center>. For disability services please contact Carrie Pfeifer at (507) 344-7577 or in her office in the Academic Resource Center.

Institutional Objectives:

1. Recognize that the historic Christian faith professes that God the Holy Trinity is the source of all knowledge and truth, and that His wisdom is most clearly revealed in the life, death, and resurrection of Jesus Christ.
2. Demonstrate intellectual, creative, and problem-solving skills.
3. Demonstrate an understanding of personal and public responsibility.
4. Develop habits of thinking that apply to a fulfilling life of learning.

This course primarily addresses the second objective by developing an ability to:

- identify and correctly frame problems using appropriate content, theories, and methods
- work both collaboratively and independently to produce innovative applications of knowledge, creative expressions, or new insights connected to bodies of knowledge from various fields.
- gather relevant information on an issue to formulate a defensible conclusion, new idea, or connections among ideas
- analyze quantitative and qualitative data using logical reasoning skills
- articulate a message effectively in oral and written forms.

Course Outcomes: At the completion of the course, the student should be able to:

- Link graphical, numeric, and symbolic approaches when interpreting situations and analyzing problems.
- Combine reason, experience, and knowledge from this course to critically interpret a problem using an appropriate mathematical model, determine the methods of solution for problems, apply those methods correctly, and judge whether any solutions are reasonable.
- Write clear, correct, and complete solutions to mathematical problems utilizing proper mathematical notation and appropriate language to clearly and coherently explain the process. • Participate actively and responsibly in all course activities.
- Communicate the difference between an exact and an approximate solution and determine which is more appropriate for a given problem.

Course Grade: The distribution of your grade is as follows:

40 percent	Exams (including final exam)
40 percent	Homework
20 percent	Discussions and Quizzes

Final grades will be based on the percentages shown below. I reserve the right to lower, but not raise these cutoff points. The cutoff points are:

>92.5%	A	82.5-87.49%	B	70.0-77.49%	C
90.0-92.49%	A-	80.0-82.49%	B-	60.0-69.99%	D
87.5-89.99%	B+	77.5-79.99%	C+	0-59.99%	F

Homework: Homework will be completed online. XYZ homework provides immediate feedback on homework assessments providing a “self-check” for completed work that allows students to immediately know the areas in which they need more help and practice. Students will be allowed to re-attempt new versions of each homework question type to improve their score. Students may use open book & open notes to complete their homework. Students may also ask questions on the homework forum for the question type they are struggling with, and are encouraged to seek assistance from fellow students, tutors, and the instructor as needed.

Discussions: Throughout the course, there will be discussion boards in which you must respond to the question asked and reply to at least one other student’s post. Each discussion is worth 10 points: five points for answering the questions posed, two points for accurate writing and grammar, and three points for a **meaningful and constructive** reply to another student’s post.

Exams: All students will be notified on Moodle the week prior to the date that an exam will occur. A midterm exam and a comprehensive final examination will be given at the middle and the end of the summer session. Students must take the final exam during this time, no exceptions. Note that all exams will be proctored, and it is the student’s responsibility to find an appropriate proctor for their exams.

Missed Work or Exams: Missed exams will not be made up. Exceptions will be made only at the discretion of the instructor *provided arrangements are made in advance*. I realize in the case of extreme emergencies this may not be possible. In that case, I should be contacted as soon as possible. Verification of the emergency should be provided. The exam given in place of the missing exam will NOT be the same as the original exam, but will cover the same material, as well as reflecting the fact that you had more time to study. That is, there is no guarantee of having the same level of difficulty. If there is a known and legitimate conflict with an exam date, you must contact me before 5 p.m. the day before the exam is due and schedule a time to make-up the exam within 48 hours of its original time.

Course Outline: The direction of the course is as follows:

Angles

- Convert radians to degrees and vice versa.
- Solve applied problems involving arc length and area/
- Calculate the reference angle for a given angle and determine angles coterminal with a given angle.

Right Triangles, Unit Circles, and the Trigonometric Functions

- Define all six trigonometric functions based upon the unit circle and the extension to right triangles.
- Understand the Pythagorean Identity from the definitions of sine and cosine based upon the unit circle.
- Apply the definitions of the trigonometric functions in terms of right triangles to solve for missing sides and angles of right triangles.
- Given a trigonometric function value for an angle, determine the other five trigonometric function values for the same angle.
- Solve applied problems involving right triangle trigonometry.
- Determine or calculate trigonometric function values for $\pi/6$, $\pi/4$, $\pi/3$, $\pi/2$, and π as well as angles which are coterminal to these or have these as reference angles.

Non-right Triangles

- Apply the law of sines and the law of cosines to solve for unknown sides and angles of triangles.
- Solve applied problems associated with these laws.

Graphical, numerical, symbolic, and verbal approaches to trigonometric problems

- Sketch the graphs of trigonometric functions and their transformations and state the domain and range of these functions.
- Identify the amplitude, period, vertical shift, and phase shift (horizontal shift) from a graph, formula, table, or verbal description.
- Given the graph of trigonometric functions or their transformations determine a formula for the graph.
- Use trigonometric functions to model periodic behavior described numerically or verbally.
- Solve applied problems involving harmonic motion.

Inverses

- Evaluate inverse trigonometric functions involving the basic angles by applying the domain and range of these functions.
- Identify the graphical relationships between sine, cosine, and tangent and their inverses.
- Relate the domain and range of the inverse trigonometric functions to the domain and range of trigonometric functions.
- Solve trigonometric equations using inverse trig functions.

Solving Trigonometric Equations

- Solve trigonometric equations for all solutions, providing exact solutions when appropriate, and using technology to find approximate solutions when appropriate.

Parametric and Polar forms

- Compare and contrast the Cartesian coordinate system and the polar coordinate system, identifying strengths of each and which type of graph is better suited for each coordinate system
- Convert to polar equations and understand the potential advantages in doing so.
- Use parametric equations when they are dependent on a third parameter.

Confidentiality and Mandatory Reporting:

As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep information you share private to the greatest extent possible. However, I am required to report information regarding sexual misconduct or information about a crime that may have occurred on BLC's campus with the college. According to policy, faculty and staff are "required to report any knowledge they have about sexual assault, relationship violence, or stalking to the Title IX Coordinator." To report and request help from Bethany Lutheran College following an incident, you can contact the police (911) or Bethany Campus Security (507.344.7888). If you wish, you may remain anonymous and report via the website <https://forms.blc.edu/title-ix-reporting/>. The following individuals are trained to provide you with support that may also remain confidential. Please reach out to them for assistance:

Chaplain Don Moldstad: 507.344.7312
Mark DeGarmeaux: 507.344.7429
Doyle Holbird: 507.344.7753
WLCFS Counseling services: 800.438.1772 option #1

Disclaimer: The instructor reserves the right to alter any portion of the syllabus or curriculum as necessary. If this occurs, the instructor will notify everyone both in class and via email.