

Saint Leo University

MAT152 Trigonometry

Course Description:

Topics include trigonometric functions, trigonometric identities and equations, the laws of sines and cosines, complex numbers, polar coordinate system, and DeMoivre's Theorem. Intended as a preparation for the first course in calculus, MAT 231.

Prerequisite:

C or better in MAT151 or mathematics placement

Textbooks:

Pearson. (2017). *Mymathlab Plus-Access* (2nd ed.). Boston, MA: Pearson Custom.
ISBN: 978-1-323-57941-1

Mymathlab Plus-Access (above) includes access to an e-book version of the required text below. You may purchase the print version of the text if you wish.

Blitzer, R. (2018). *Algebra and trigonometry – with 2 CDs* (6th ed.). Boston, MA: Pearson-Prentice Hall.
ISBN-13: 978-0-13-446608-8

Learning Outcomes:

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

- Evaluate the six trigonometric functions of any angle; utilize the sum, difference, double angle, and half angle formulas and prove identities involving trigonometric identities; graph and determine the properties of all the six trigonometric functions and their transformations.
- Understand and use the inverses of sine, cosine, and tangent functions and solve trigonometric equations.
- Solve both right and not right triangles with the use of Right Triangle Trigonometry, Law of Sine and the Law of Cosine, and be able to solve application problems involving triangles.
- Construct vectors, a polar coordinate system, graph as well as represent points in the polar coordinate system, and use this to also represent complex numbers using polar form and apply DeMoivre's Theorem.
- Demonstrate how the SLU Core Value of Excellence is used in the application of trigonometric theorems in say engineering and construction.

Core Value:

Excellence: Saint Leo University is an educational enterprise. All of us, individually and collectively, work hard to ensure that our students develop the character, learn the skills, and assimilate the knowledge essential to become morally responsible leaders. The success of our University depends upon a conscientious commitment to our mission, vision, and goals.

Evaluation:

Your grade in the course will be based on the following:

Assignment	% of Total
Tests	36%
Assignments	24%
Discussions	8%
Group Project	12%
Final Exam	20%
Total	100%

Grading Scale:

Grade	Score (%)
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D+	67-69
D	60-66
F	0-59

Tests:

The course will include three tests, which are to be completed in Modules 2, 4, and 6. The tests are available on MyMathLab only, and 75 or 85 minutes will be given for completion.

Assignments:

There are eight (8) assignments in this course that can be accessed through MyMathLab by clicking on the assignment link in each module. Some questions have videos that accompany them to help you learn key concepts. You can work the questions an unlimited number of times in order to answer them correctly.

Discussions:

In online courses, students seek interaction with other students and the instructor. Since there is no face-to-face meeting, this interaction impacts the effectiveness of learning online. As such, class participation is essential and will account for a significant part of your grade. Plan to contribute to every discussion topic with "quality" contributions. In other words, responses should express clear thinking and demonstrate relevance to the module concepts. This always involves more than just "I agree."

- Students will be required to interact within one threaded discussion each week.
- The weekly module discussion question will be posted by the instructor.
- Instructions and grading criteria for the discussion postings are available under Discussion Guidelines in the Start Here menu.
- You must post three responses to the Discussion Board for each module:
 - Your response to the instructor's Discussion Board question is due on or before **Thursday at 11:59 p.m. EST/EDT**.
 - Your responses to at least two other classmates' postings are due on or before **Sunday at 11:59 p.m. EST/EDT**.
- Three posts per discussion is only a minimum. Students are encouraged to ask each other question(s) within the discussions, too.

Due dates for the initial answers and responses to others will be strictly enforced.

Group Project:

Your instructor will randomly assign you to a team of 4 to 5 members. There may be five teams: Teams A, B, C, D, and E. You will have an opportunity to discuss the project with your members via the Discussion Board in the Start Here menu.

As a group, select and complete ONE of the following group exercises from the textbook.

Page 619/119: Please turn in all the plots you have created for the members of the team. After completing this problem, write up your finding and your experience with this idea. As a group, discuss

whether this is valid information on us. Explain your answer. Write up the responses to the question and create a PowerPoint presentation of your result.

Page 660/78: Please note that as a team you are to create a PowerPoint presentation as your seminar response.

Or

Page 680/97: Please note that as a team you are to create a PowerPoint presentation as your pamphlet.

After completing the assignment, please explain how the Saint Leo Core Value of *Excellence* is essential to this example and how your team in particular utilized this Core Value. Each student should complete the chosen problem and the group should have a discussion about everyone's work.

Please make sure you discuss the answers and choose the correct or best response to the problem. One member of your team must post the team's final responses to Group Results Discussion Board in Module 5. The post should contain the question the team chose and the team's response. Make sure to label your final response in the subject line as: Module 5 Final Response Team Z.

The final response should be no less than 500 words in length. You must complete this assignment **no later than Sunday 11:59 PM EST/EDT of Module 5**.

Final Exam:

The course will include a Final Exam given in Module 8. The Final Exam is available on MyMathLab only. The exam is 40 questions in length and 100 minutes will be given for completion.

Course Schedule:

Module 1 Review of Concepts in Algebra and Define the Six Trigonometric Functions

Objectives:

When you complete this module, you should be able to:

- Convert between radian and degree measures.
- Draw angles in standard position and identify coterminal angles.
- Use right triangle trigonometry to evaluate trigonometric functions.
- Find the six trigonometric values of the special angles 30° , 45° , 60° .
- Recognize and use fundamental identities.
- Evaluate trigonometric functions with a calculator.
- Use right triangle trigonometry to solve applied problems.

Assignments

Items to be Completed:	Due No Later Than:
Post introduction to the class	Thursday 11:59 PM EST/EDT
Read Sections 5.1 and 5.2	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 1	Sunday 11:59 PM EST/EDT

Module 2 Trigonometric Functions of Any Angles and Any Real Number

Objectives:

When you complete this module, you should be able to:

- Determine the trigonometric functions of any angles and any real numbers.
- Find reference angles and use them to evaluate trigonometric functions.
- Be able to identify the domain and range of the sine and cosine function.
- Utilize the even, odd, and periodic properties of the trigonometric functions.

Assignments

Items to be Completed:	Due No Later Than:
Read Sections 5.3 and 5.4	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 2	Sunday 11:59 PM EST/EDT
Complete Test 1	Sunday 11:59 PM EST/EDT

Module 3**Graphs of Trigonometric Functions and Inverse Trigonometric Functions****Objectives:**

When you complete this module, you should be able to:

- Graph the elementary trigonometric functions: sine, cosine, tangent, cotangent, secant, and cosecant as well as their transformations.
- Describe the global and local properties of the above trigonometric functions.
- Use inverse trigonometric functions.
- Use a calculator to evaluate inverse trigonometric functions.
- Evaluate composite trigonometric functions.

Assignments

Items to be Completed:	Due no later than
Read Sections 5.5, 5.6, and 5.7	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 3	Sunday 11:59 PM EST/EDT

Module 4**Some Applications of Right Triangle Trigonometry and Verifying Identities****Objectives:**

When you complete this module, you should be able to:

- Solve right triangles.
- Use right triangle trigonometry to solve application problems.
- Verify trigonometric identities.

Items to be Completed:	Due No Later Than:
Read Sections 5.8 and 6.1	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 4	Sunday 11:59 PM EST/EDT
Complete Test 2	Sunday 11:59 PM EST/EDT

Module 5**More Formulas to Compute Non-Special Angles and Solving Trigonometric Equations****Objectives:**

When you complete this module, you should be able to:

- Use the formulas for the sine, cosine, and tangent of the sum and difference of two angles.
- Use the double angle formulas for the sine, cosine, and tangent of an angle.
- Use the power-reducing formulas.
- Use the half-angle formulas for the sine, cosine, and tangent of an angle.
- Find all solutions of a trigonometric equation that are linear and quadratic in form.

Items to be Completed:	Due No Later Than:
Read Sections 6.2, 6.3, and 6.5	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 5	Sunday 11:59 PM EST/EDT
Complete Group Project	Sunday 11:59 PM EST/EDT

Module 6**The Laws of Sines and Cosines****Objectives:**

When you complete this module, you should be able to:

- Use the Law of Sines to solve triangles and to determine if a triangle is constructible.
- Use the Law of Cosines to solve triangles.
- Solve application problems using the Law of Sines and Cosines.

Items to be Completed:	Due No Later Than:
Read Sections 7.1 and 7.2	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 6	Sunday 11:59 PM EST/EDT
Complete Test 3	Sunday 11:59 PM EST/EDT

Module 7**Applications of Trigonometry in Polar Graphs and Complex Numbers****Objectives:**

When you complete this module, you should be able to:

- Plot points in the polar plane.
- Convert points between rectangular and polar form.
- Convert and graph polar equations.
- Plot complex numbers in the complex plane.
- Convert complex numbers between rectangular and polar form.
- Find products, quotients, powers, and roots of complex numbers.

Items to be Completed:	Due No Later Than:
Read Sections 7.3, 7.4, and 7.5	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 7	Sunday 11:59 PM EST/EDT

Module 8**Vectors****Objectives:**

When you complete this module, you should be able to:

- Determine if two vectors are equal.
- Construct scalar multiples of vectors, and sums and differences of vectors.
- Find unit vectors in the direction of a given vector.
- Find the dot product of vectors.
- Determine if two vectors are orthogonal.

Items to be Completed:	Due No Later Than:
Read Sections 7.6 and 7.7	
Post initial response to the discussion question	Thursday 11:59 PM EST/EDT
Post responses to at least two classmates	Sunday 11:59 PM EST/EDT
Complete Assignment 8	Sunday 11:59 PM EST/EDT
Complete Final Exam	Sunday 11:59 PM EST/EDT