
LAKELAND COMMUNITY COLLEGE - COURSE OUTLINE FORM

ORIGINATION DATE: 8/2/99 APPROVAL DATE: 3/22/12
LAST MODIFICATION DATE: 3/28/12 EFFECTIVE TERM/YEAR: FALL/ 12
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COURSE ID: MATH1700
COURSE TITLE: Trigonometry

	LECTURE	LAB	CLINICAL	TOTAL	OBR MIN	OBR MAX
CREDITS:	3.00	0.00	0.00	3.00	3.00	3.00
CONTACT HOURS:	3.00	0.00	0.00	3.00		

PREREQUISITE:

MATH1650 OR PLACEMENT TEST

COURSE DESCRIPTION:

This course includes the study of trigonometric functions and inverse trigonometric functions and their graphs; solutions of right and oblique triangles and their applications; solutions of trigonometric equations; the use of identities, vectors, and complex numbers; and graphs of polar and parametric equations. Students will need to supply a graphing utility; the instructor will provide details.

RATIONALE FOR COURSE:

This course serves as a prerequisite for the Analytical Geometry and Calculus sequence, as well as a foundation course for Engineering and Science majors.

GENERAL COURSE GOALS:

The course will

1. Further develop students' ability to use the language of mathematics correctly in speaking and writing.
 2. Introduce and develop, in a mathematically rigorous manner, the concepts and applications of the trigonometric functions.
 3. Further develop the use of technology as a tool for solving problems.
 4. Further develop students' abilities to solve real-life problems including modeling utilizing the trigonometric functions and analyze and solve these problems analytically and graphically.
 5. Further strengthen students' ability to critically apply mathematical thinking to solve problems and to determine reasonableness of results.
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COURSE OBJECTIVES:

Upon completion of the course, the student should be able to

1. Define the six trigonometric functions as circular functions.
2. Define the six trigonometric functions of angles given a point on the terminal side of an angle in standard position.

3. Define the six trigonometric functions for an acute angle within a right triangle.
4. Evaluate the trigonometric functions of angles in radian and degree measure exactly using the unit circle and approximately using a calculator.
5. Graph the six trigonometric functions and determine phase shifts, vertical shifts, period, and amplitude changes, where applicable.
6. Solve right triangles; apply right triangles to real-world problems.
7. Solve oblique triangles using the Law of Sines and Law of Cosines; apply to real-world problems.
8. Use the fundamental trigonometric identities.
9. Graphically and analytically verify identities.
10. Solve and apply trigonometric equations graphically and analytically.
11. Define the inverse trigonometric functions.
12. Graph the inverse trigonometric functions.
13. Convert from Cartesian coordinates to polar coordinates and vice-versa.
14. Graph in polar coordinates.
15. Analyze the path of objects via parametric equations and their graphs.
16. Use vectors to model basic forces.
17. Represent complex numbers in trigonometric form.

COURSE OUTLINE:

- I. Angles
 - A. Radian and degree measurement
 - B. Positive, negative, and coterminal
 - C. Standard position
 - D. Applications
- II. Circular Functions
 - A. Unit circle and definition of 6 trigonometric functions
 1. domain and range
 - B. Sine and cosine Functions
 1. function values for $\cos x$ and $\sin x$ via unit circle
 - C. Tangent function
 - D. Cosecant, secant, and cotangent functions
 - E. Graphs of all 6 trigonometric functions and their characteristics
 - F. Periodic functions
 1. model periodic behavior with appropriate function
- III. The Inverse Trigonometric Functions
 - A. Definitions
 1. domain and range
 - B. Notation
 - C. Graphs
- IV. Triangles
 - A. Right triangles
 1. definition of 6 trigonometric functions
 2. solving right triangles

- 3. applications
 - B. Oblique triangles
 - 1. Law of sines
 - a. applications
 - 2. Law of cosines
 - a. applications
 - 3. area
 - C. Similar triangles
- V. Identities and Equations
- A. Fundamental identities
 - 1. reciprocal identities
 - 2. quotient identities
 - 3. Pythagorean identities
 - 4. negative angle (even / odd) identities
 - B. Sum and difference identities
 - 1. sine, cosine, and tangent
 - C. Double angle identities
 - 1. sine, cosine, and tangent
 - D. Additional identities
 - 1. half-angle
 - E. Verification
 - 1. graphical and analytical
 - F. Conditional equations
 - 1. solving via graphical and analytical methods
- VI. Vectors
- A. Definition
 - B. Algebra of vectors
 - 1. addition
 - 2. subtraction
 - 3. scalar multiplication
 - 4. dot product
 - a. angle between vectors
 - C. Applications
- VII. Parametric Equations, Polar Coordinates, and Polar Equations
- A. Definition
 - B. Analysis via rule of three
 - C. Applications
 - D. Polar coordinates
 - 1. convert from Cartesian coordinates to polar coordinates and vice-versa
 - 2. graph in polar coordinates
 - a. lines
 - b. circles
 - c. limacons
 - d. lemniscates
 - e. roses
 - f. cardioids
 - 3. symmetry of graphs
 - E. Polar/trigonometric form of complex numbers
 - 1. products and quotients
 - 2. As time permits: powers and roots of complex numbers

INSTRUCTIONAL PROCEDURES THAT MAY BE UTILIZED:

Lecture/discussion
 Computer/graphing calculator based activities
 Group and/or individual activities
 Research projects utilizing real data gathered from the Internet or other sources

GRADING PROCEDURES:

It is recommended that instructors have at least five evaluative items on which to determine student's final grade. In general, tests are given covering the lecture and homework assignments. At least 80% should come from in-class assessments without the aid of notes or textbooks.

COURSE EVALUATION PROCEDURES:

Student course evaluations

Student success rate in subsequent Math courses

LAKELAND LEARNING OUTCOMES

	Methods of Assessment								
	1	2	3	4	5	6	7	8	9
LEARNS ACTIVELY									
1. Takes responsibility for his/her own learning									
2. Uses effective learning strategies									
3. Reflects on effectiveness of his/her own learning strategies									
THINKS CRITICALLY									
4. Identifies an issue or idea									
5. Explores perspectives relevant to an issue or idea									
6a. Identifies options or positions									
6b. Critiques options or positions									
7. Selects an option or position	1	2							
8a. Implements a selected option or position									
8b. Reflects on a selected option or position									
COMMUNICATES CLEARLY									
9a. Uses correct spoken English									
9b. Uses correct written English									
10. Conveys a clear purpose									
11. Presents ideas logically	1	2							
12a. Comprehends the appropriate form(s) of expression	1	2							
12b. Uses the appropriate form(s) of expression	1	2							
13. Engages in an exchange of ideas									
USES INFORMATION EFFECTIVELY									
14. Develops an effective search strategy									
15a. Uses technology to access information	1	2							
15b. Uses technology to manage information									
16. Uses selection criteria to choose appropriate information									
17. Uses information responsibly									
INTERACTS IN DIVERSE ENVIRONMENTS									
18a. Demonstrates knowledge of diverse ideas									
18b. Demonstrates knowledge of diverse values									
19. Describes ways in which issues are embedded in relevant contexts									
20a. Collaborates with others									
20b. Collaborates with others in a variety of situations									
21. Acts with respect for others									

Methods of Assessment Codes:		
1. Test/Examination	4. Collaborative Writing	7. Portfolio
2. Homework/Written Assignment	5. Presentation	8. Demonstration of Skills
3. Research Project	6. Lab Project	9. Other (Specify in Grading Procedures)