

Instructor's Name:

Office Location:

Office Hours:

Office Phone:

E-mail:

Course Description

Precalculus II is the study of the trigonometric functions using the unit circle approach and right triangle trigonometry. Topics of study include the following: graphs of trigonometric functions, inverse trigonometric functions, trigonometric identities, trigonometric equations, applications of trigonometric functions, polar coordinates, complex numbers in trigonometric form, vectors and parametric equations. Both radian and degree measure will be used.

Illinois Articulation Initiative (IAI) number: N/A

Credit and Contact Hours:

Lecture	4
Lab	0
Credit Hours	4

Prerequisites: Satisfactory placement test score or grade of "C" in Math 138 or equivalent.

Books, Supplies, and Supplementary Materials

A. Textbooks

Required: Precalculus: Concepts Through Functions w/o Access Code, 3rd Ed., 2015, Sullivan.
Publisher: Pearson Education
ISBN: 9780321931047Pearson

MyMathLab Stand Alone Student Access Kit (Optional),
ISBN: 9780321199911, Pearson Education
Publisher: Pearson Education

or Precalculus: Concepts Through Functions w/ Access Code, 3rd Ed., 2015, Sullivan.
ISBN: 9780321926036, Pearson Education

B. Other Required Materials

TI-83+ or TI-84+ graphing calculator

Methods of Instruction:

Lecture
Online

Student Learning Outcomes: General Education Student Learning Outcomes:

Students will demonstrate the ability to accurately apply correct mathematical methods and techniques in various applications such as applied sciences, theoretical mathematics, physics, natural sciences and other applied sciences.

Objectives

Algebra Review and Functions

- Review as needed

Introduction to Trigonometric Functions

1. Define an angle and explain when angles are positive and negative.
2. Explain when an angle is in standard position and draw angles using degree and radian measure.
3. Convert between angles in degree, minutes, seconds and decimal form.
4. Convert angles between radian measure and degree measure.
5. Determine arc length and the area of the sector.
6. Find the linear speed of an object traveling in a circular motion.
7. Define the six basic trigonometric functions using the unit circle and a circle of radius r .
8. Determine the domain, range, and period of the trigonometric functions.
9. Determine the sign of each trigonometric function in each of the four quadrants.
10. Find the trigonometric functions of an angle in terms of a function of its reference angle.
11. Use the fundamental identities to find the exact values of an angle.
12. Determine which of the trigonometric functions are even and which are odd.

Graphs of Trigonometric Functions

1. Draw one cycle of the graphs for the six trigonometric functions giving the properties of the graph.
2. State amplitude, period of variation, and phase shift of trigonometric functions.
3. Graph equations of the form $y = a \sin(bx + c)$, $y = a \cos(bx + c)$, $y = a \tan(bx + c)$, $y = a \csc(bx + c)$, $y = a \sec(bx + c)$, $y = a \cot(bx + c)$ using the graph transformations.
4. Given a sinusoidal graph, find its equation.

Inverse Trigonometric Functions

1. Define the inverse sine, cosine and tangent functions giving the domain and range.
2. Find the exact and approximate values of the inverse sine, cosine and tangent functions.
3. Find the exact value of expressions involving the inverse sine, cosine and tangent functions.
4. Use a calculator to evaluate the inverse secant, cosecant and cotangent functions.

Trigonometric Identities

1. Explain what is meant by an identity equation.
2. Use algebra and the fundamental identities to establish an identity.
3. Establish an identity involving inverse trigonometric functions.
4. Use the sum and difference formulas to find exact values and establish identities
5. Use the double-angle and half-angle formulas to find exact values and establish identities
6. Express products as sums and sums as products using the trigonometric formulas.

Trigonometric Equations

1. Solve equations involving a single trigonometric function.
2. Solve trigonometric equations quadratic in form.
3. Solve trigonometric equations using identities.
4. Solve trigonometric equations linear in sine and cosine.

Applications of Trigonometric Functions

1. Define the six basic trigonometric functions using right triangles.
2. Define the complementary angle theorem.
3. Solve right triangles.
4. Solve oblique triangles using the Law of Sines and the Law of Cosines.
5. Find the area of any triangle using the triangle area formulas.
6. Analyze simple harmonic motion and damped motion. (optional, if time permits)

Polar Coordinates and Equations

1. Plot points using polar coordinates.
2. Find several polar coordinates of a single point.
3. Convert between polar coordinates and rectangular coordinates.
4. Convert between polar equations and rectangular equations.
5. Graph and identify polar equations
6. Test polar equations for symmetry (optional, if time permits)

Complex Numbers in Trigonometric Form

1. Define the complex plane and demonstrate how to graph complex numbers on the complex plane.
2. Define the magnitude and argument of the complex number.
3. Convert the algebraic form of a complex number to polar form and vice-versa.
4. Find the product and quotient of two complex numbers in polar form.
5. Find the n th power of complex numbers using DeMoivre's Theorem.
6. Find the n th complex roots of a complex number.

Vectors

1. Define a vector and its magnitude and direction.
2. Add, subtract and find the scalar multiples of a vector.
3. State the properties for vector addition, scalar multiplication and the equality of vectors.
4. Write the algebraic vector \mathbf{v} with the vector components.
5. Find the position vector for any vector.
6. Determine the unit vector \mathbf{u} in the same direction as a given vector.
7. Write a vector from its direction and magnitude.
8. Determine the dot product of two vectors and state the properties of the dot product.
9. Determine the angle between two vectors.
10. Determine whether two vectors are orthogonal or parallel vectors.

Parametric equations

1. Graph parametric equations
2. Find a rectangular equation for a curve defined parametrically
3. Use time as a parameter in parametric equations
4. Find a parametric equation for curves defined by rectangular equations

TOPICAL OUTLINE

<u>Weeks</u>	<u>Topic and Class Activity</u>
1	Function Review
1 1/2	Introduction to the Trigonometric Functions
1 1/2	Graphs of Trigonometric Functions
1	Inverse Trigonometric Functions
2	Trigonometric Identities
1	Trigonometric Equations
2	Applications of Trigonometric Functions
1	Polar Coordinates and Equations
1	Complex Numbers in Trigonometric Form
2	Vectors
1/2	Parametric Equations
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16 weeks	

Graded Assignments and Policies

Graded Assignments

In class Quizzes	0 – 20%
Participation	0 - 5 %
Projects	0 – 20%
Homework	0 – 30%
Tests	50 - 85%
Final	15 – 30%

Grading Policy

The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly.

Each instructor will set minimum standards for performance on tests.

Grading Scale

90-100%	A
80-89%	B
70-79%	C
60-69%	D
0-59%	F

Major Tests and Quizzes

The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly. Each instructor will set minimum standards for performance on tests. A comprehensive final examination will be given.

Classroom Policies and Procedures

General Information

Attendance Policy

Make-up Policy

Extra-credit Policy

Final Exam Information

A comprehensive final examination will be given.

Academic Honor Code

The objective of the academic honor code is to sustain a learning-centered environment in which all students are expected to demonstrate integrity, honor, and responsibility, and recognize the importance of being accountable for one's academic behavior.

College Statement about grades of "F" and Withdrawal from Class

Students may withdraw from a course by processing an add/drop form during regular office hours through the Registration and Records Office at Main Campus or Romeoville Campus, or by phone at 815-744-2200. Please note the withdrawal dates listed on your bill or student schedule. Every course has its own withdrawal date. Failure to withdraw properly may result in a failing grade of "F" in the course.

At any time prior to the deadline dates established, an instructor may withdraw a student from class because of poor attendance, poor academic performance or inappropriate academic behavior, such as, but not limited to, cheating or plagiarism.

Intellectual Property

Students own and hold the copyright to the original work they produce in class. It is a widely accepted practice to use student work as part of the college's internal self-evaluation, assessment procedures, or other efforts to improve teaching and learning and in promoting programs and recruiting new students. If you do not wish your work to be used in this manner, please inform the instructor.

Student Code of Conduct

Each student is responsible for reading and adhering to the Student Code of Conduct as stated in the college catalog.

Sexual Harassment Joliet Junior College seeks to foster a community environment in which all members respect and trust each other. In a community in which persons respect and trust each other, there is no place for sexual harassment. JJC has a strong policy prohibiting the sexual harassment of one member of the college community by another. See the Catalog or Student Handbook.

Student Support <http://jjc.edu/services-for-students/pages/default.aspx>

- a. Disability Services: <http://www.jjc.edu/disability-services/Pages/default.aspx>.
Student Accommodations and Resources (StAR): If you need disability-related accommodations, specialized tutoring, or assistive technology in this class, if you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class. New students should request accommodations and support by scheduling an appointment with the Student Accommodations and Resources (StAR) Office, Campus Center 1125, (815) 280-2230.
- b. Tutoring: <http://jjc.edu/tlc/Pages/default.aspx>
- c. Counseling and Advising: <http://www.jjc.edu/counselingadvising/Pages/default.aspx>
- d. Academic Resources: <http://www.jjc.edu/academic-resources/Pages/default.aspx>
- e. Support Programs and Services:
<http://www.jjc.edu/support-programs-services/Pages/default.aspx>
- f. Technology Support: <http://jjc.edu/services-for-students/Pages/technology-support.aspx>
- g. My Degree Progress: My Degree Progress is a computerized system to track a student's progress toward graduation. The report indicates every course and places these courses into their appropriate category as a General Education, Major Course, or Elective, according to the degree requirements. This tool is useful for preparing before an advising appointment, for planning, for registering, and for checking that the student is on track for graduation. <https://eresources.jjc.edu>

*** Instructor reserves the right to modify, add to or change the syllabus. Any changes to the syllabus or schedule will be announced in class.**

Prepared by:

Reviewed by:

Prof. David Ruffatto
Prof. Joanne Brunner

Prof. Jean McArthur
Department Chair Date

Reviewed 5/15
Revised 02/11
Revised 08/09
Revised 04/09
Revised 02/07
Revised 10/06
Revised 04/06
Revised 01/03