
Geometry and Trigonometry

Applied Science and Environmental Technology

Course Number: MAT8050	Co-Requisites: N/A	Pre-Requisites: N/A
Applicable Program(s): Multiple Programs	AAL: Multiple Levels	Core/Elective: Multiple Core/Elective
Prepared by:	Michael Delgaty, Coordinator of Mathematics	
Approved by:	Adam Shane, Chair, ASET	
Approval Date:	Tuesday, July 16, 2019	
Approved for Academic Year:	2019-2020	
Normative Hours:	42.00	

Course Description

Students study the manipulation of algebraic expressions as a foundation for advanced mathematical concepts and solve a variety of measurement problems involving U.S. Customary and SI units. Students learn to graph simple polynomials and sinusoidal curves using a table of values or by using shifts, shrinks and stretches. They calculate the perimeter and area of basic geometric figures and calculate the surface area and volume of solid geometric figures. Students manipulate trigonometric functions of acute angles and solve problems involving the trigonometry of right triangles and vectors. Delivered in a modular format, this course is equivalent to the completion of all of the following math modules MAT8100 - a, d, m, n, k, and f.

Relationship to Vocational Learning Outcomes

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

1518X01FWO - Manufacturing Engineering Technician

- VLO 1 Analyze and solve routine technical problems related to manufacturing environments through the application of engineering principles. (T, A,)

0018X01FWO - Architectural Technology**0018X03FWO - Architectural Technology**

- VLO 5 Solve technical problems related to building projects through the application of principles of building science and mathematics. (T, A,)

0188W01FWO - Architectural Technician

0188W03FWO - Architectural Technician

0188X01FWO - Architectural Technician

0188X03FWO - Architectural Technician

- VLO 5 Assist in solving technical problems related to building projects through the application of principles of building science and mathematics. (T, A,)

0190W01FWO - Construction Engineering Technician

- VLO 6 Collect, process and interpret technical data to produce written and graphical project-related documents. (T, A,)
- VLO 9 Contribute to the resolution of technical problems related to the design and implementation of construction projects by applying engineering concepts, basic technical mathematics and building science. (T, A,)

0190W03FWO - Construction Engineering Technician

0190X01FWO - Construction Engineering Technician

0190X03FWO - Construction Engineering Technician

- VLO 6 Collect, process and interpret technical data to produce written and graphical project-related documents. (T,)
- VLO 9 Contribute to the resolution of technical problems related to the design and implementation of construction projects by applying engineering concepts, basic technical mathematics and building science. (T, A,)

0192X01FWO - Civil Engineering Technology

0192X03FWO - Civil Engineering Technology

- VLO 8 Participate in the design and modeling phase of civil engineering projects by applying engineering concepts, technical mathematics and principles of science to the review, production and/or modification of project plans. (T, A,)

Relationship to Essential Employability Skills

This course contributes to your program by helping you achieve the following Essential Employability Skills:

- EES 3 Execute mathematical operations accurately. (T, A)
- EES 4 Apply a systematic approach to solve problems. (T, A)
- EES 5 Use a variety of thinking skills to anticipate and solve problems. (T, A)

Course Learning Requirements/Embedded Knowledge and Skills

When you have earned credit for this course, you will have demonstrated the ability to:

1.) Perform basic algebraic operations.

Perform basic mathematical operations such as addition, subtraction, multiplication, and division of numbers.

Apply the rule of order of operations on numeric expressions.

Calculate roots, powers and absolute values of numbers using a calculator.

Express and perform calculations with numbers in scientific notation.

Identify and distinguish the terms and factors within a polynomial.

Add, subtract, and multiply polynomials.

Apply the exponent rules to simplify monomials containing integer powers.

Solve simple equations.

Round numbers to the indicated number of significant digits.

2.) Solve a variety of measurement and unit conversion problems.

Use dimensional analysis to convert between measurement units.

Convert linear units of measure within the U.S. Customary and Metric systems.

Convert linear units of measure between the U.S. Customary and the metric system.

Convert area and volume units within and between measurement systems.

Convert between Fahrenheit and Celsius temperature scales.

Convert composite and fractional units within and between measurement systems.

Round numbers to the indicated number of decimal places.

3.) Solve a variety of geometric problems.

Use the properties of alternate and opposite angles to calculate angles.

Use the properties of transversal lines to calculate segments.

Calculate the sides, angles, perimeter and area of triangles using:

- The properties of isosceles, equilateral and right triangles
- The Pythagorean theorem
- The properties of similar triangles

Calculate the perimeter and area of quadrilaterals using the properties of the square, rectangle, parallelogram and trapezoid.

Calculate circumference and area of a circle.

Calculate the length of an arc and the area of a sector.

Estimate the measure of an irregular area using:

- The trapezoidal rule
- Simpson's rule

Calculate the volume and surface area of the solid geometric figures: cylinder, cone, sphere and pyramid.

4.) Define and use trigonometric functions.

Identify angles and their measure.

Define the trigonometric functions for acute angles.

Define the reciprocal trigonometric functions for acute angles.

Calculate values of trigonometric functions (acute angles): $\sin$, $\cos$, $\tan$.

Solve right triangles for any missing angles and/or sides.

Solve applied problems using trigonometry.

Solve for angles in any quadrant given the reference angle.

5.) Graph simple Polynomial and Sinusoidal Functions.

Create a table of values using Function Notation.

Manipulate equations representing straight lines to identify the slope and intercepts of the line.

Graph straight lines using the slope and intercept, the slope and a point, or two points.

Given a straight line, determine the equations of lines that are parallel and perpendicular to the given line.

Identify and sketch horizontal and vertical lines.

Graph and write linear equations in slope-intercept form, point-slope form, and standard form.

Sketch quadratic functions by finding the vertex and using shifts and stretches.

Solve the quadratic formula to find any x-intercepts of a quadratic equation.

Identify the period, amplitude and phase-shift of trigonometric functions.

6.) Apply vectors to solve problems.

Solve vector problems graphically.

Solve vector problems analytically using vector components.

Add and subtract vectors both graphically and analytically using vector components.

Solve practical application problems involving vectors.

Learning Resources

Required Software: MyLab Math Software, Pearson Publications.

Required/Suggested Textbooks: **Suggested** for programs (0188X - Architecture and 1518X - Manufacturing),
Required for 0192X - Construction Engineering)

"Basic Technical Mathematics with Calculus SI Version, 11th ed." by Washington, Evans, Boué and Martin, Pearson Publications, 2020

Other Required Resources:

Scientific Calculator. Many programs require specific calculators for other courses, please consult with your program professors before choosing a calculator, but also note that graphing calculators are NOT permitted for use in this course.

Learning Activities

class lectures
discussions
problem solving activities
electronic demonstrations
homework exercises

Evaluation/Earning Credit

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Quiz(zes)/Test(s) (80%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, EES 3, EES 4, EES 5

Online Activity(ies)/Assignment(s) (20%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, CLR 6, EES 3, EES 4, EES 5

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

Prior Learning Assessment and Recognition

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Challenge Exam

Grade Scheme

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

Course Related Information

In order to pass this course, **students must pass every module**. In order to pass a module, students must attain a **grade of AT LEAST 65% on a module test**. Students may attempt a module test a maximum of three times per semester. One module test for every module will be held during regular class time. Students may write up to two alternate versions of the module test. These re-writes are completed in the Math Test Centre on students' own time. Re-writes must be completed before the end of the semester. The highest passing module test grade will be used to calculate the final grade.

Many programs require math as a prerequisite for other courses. Please note that failing one module could leave a student unable to take other core program courses. For this reason it is strongly suggested that students re-write failed module tests as soon as possible after getting feedback on the previous attempt.

Students who receive a failing grade may reclaim their course credit by completing the failed modules in class or online. In class: students may re-register for the same course and again attempt a module test a maximum of three times. The highest mark for a module in either term will be used to calculate their final grade. On-line: students may register for individual modules through the Centre for Continuing and Online Learning (CCOL). Once an online module is passed, the online module grade is used to calculate their final course grade.

Once a student passes all modules, their final grade will be recalculated and a grade change submitted. Note: all modules must be passed within 24 months of students' first registration in the course.

In all cases, the final grade will be calculated based on both the module test marks (80% of the final grade) and the online assignment marks (20% of the final grade).

College Related Information

Email

Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Students with Disabilities

If you are a student with a disability, you are strongly encouraged to make an appointment at the Centre for Accessible Learning to identify your needs. Ideally, this should be done within the first month of your program, so that a Letter of Accommodation (LOA) can be provided to your professors. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

Retroactive Accommodations

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

Academic Integrity & Plagiarism

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18: Academic Dishonesty and Discipline and AA20: Plagiarism

Student Course Feedback

It is Algonquin College's policy to give students the opportunity to share their course experience by completing a student course feedback survey for each course they take. For further details consult Algonquin College Policy AA25: Student Course Feedback

Use of Mobile Devices in Class

With the proliferation of small, personal mobile devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32: Use of Mobile Devices in Class

Transfer of Credit

It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Note: *It is the student's responsibility to refer to the Algonquin College Policies website for the most current*

Legend

Terms

- ALO: Aboriginal Learning Outcome
- Apprenticeship LO: Apprenticeship Learning Outcome
- CLR: Course Learning Requirement
- DPLO: Degree Program Learning Outcome
- EES: Essential Employability Skill
- EOP: Element of Performance
- GELO: General Education Learning Outcome
- LO: Learning Outcome
- PC: Program Competency
- PLA: Prior Learning Assessment
- PLAR: Prior Learning Assessment and Recognition
- VLO: Vocational Learning Outcome

Assessment Levels

- T: Taught
- A: Assessed
- CP: Culminating Performance