SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: Technical Mathematics I

Code No.: OEL806

Semester:

Program: Engineering Technician & Technology Programs

Author: Mathematics Department

Date: Sept 2014 **Previous Outline Dated:** Sept 2011

Approved:

Total Credits: 4

Prerequisite(s): None

Length of Course: 4 hours/week **Total Credit Hours:** 64

I. COURSE DESCRIPTION:

This first level mathematics course for engineering technology programs begins with a review of fundamental concepts including arithmetic operations and concepts in measurement. This is followed by several algebra topics including linear equations, factoring, fractions and quadratic equations. A treatment of trigonometry of right triangles, the trigonometric functions of any angle and of oblique triangles is also included.

The goals of this course are, first, to show that mathematics does play a most important role in the development and understanding of the various fields of technology and, secondly, to ensure that students acquire the mathematical and critical thinking skills necessary to analyze and solve engineering technology problems.

II. LEARNING OUTCOMES & ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

Topic 1: Basic Algebraic Operations

1. Perform basic arithmetic operations on signed numbers.
2. Take powers, roots, and reciprocals of signed numbers and algebraic quantities.
3. Convert numbers between decimal and scientific notation.
4. Simplify expressions by removing grouping symbols and combining like terms.
5. Add, subtract, multiply, and divide algebraic expressions.
6. Solve simple linear equations, and solve literal equations for the indicated letter.

Topic 2: Units of Measurement and Approximate Numbers

1. Convert units of measurement from one system to another.
2. Perform basic arithmetic operations on approximate numbers.

Topic 3: The Trigonometric Functions

1. Convert angles between decimal degrees, radians, and degrees, minutes and seconds.
2. Find the trigonometric functions of an angle.
3. Find the missing sides and angles of a right triangle.
4. Solve practical problems involving the right triangle.

Topic 4: Systems of Linear Equations

1. Find an approximate graphical solution to a system of two equations.
2. Solve a system of two equations and two unknowns by the addition-subtraction methods and by the substitution method.
3. Solve a system of two equations in two unknowns or three equations in three unknowns using addition/subtraction, or determinants.

Topic 5: Factoring and Fractions

1. Factor expressions by removing common factors.
2. Factor binomials that are the difference of the two squares.
3. Factor trinomials.
4. Reduce algebraic fractions.

5. Add, subtract, multiply and divide algebraic fractions.
6. Solve fractional equations.

Topic 6: Quadratic Equations

1. Solve by factoring.
2. Solve by using the Quadratic Formula.

Topic 7: Trigonometric Functions of any Angle

1. Identify the algebraic sign of a given trigonometric function for an angle in any quadrant.
2. Find a trigonometric function for any angle using a calculator.
3. Convert angles between radians, degrees and revolutions.

Topic 8: Vectors and Oblique Triangles

1. Determine the resultant of two or more vectors.
2. Resolve a vector into its components.
3. Solve applied problems requiring vectors.
4. Solve oblique triangles using the law of sines and the law of cosines.
5. Solve applied problems requiring oblique triangles.

III. TOPICS:
Topic numbers do not correspond with the module numbers in the web course.

	Approximate Time
Topic 1: Basic Algebraic Operations	10 hours
Topic 2: Units of Measurement	6 hours
Topic 3: The Trigonometric Functions	10 hours
Topic 4: Systems of Linear Equations	7 hours
Topic 5: Factoring and Fractions	11 hours
Topic 6: Quadratic Equations (excluding Completing the Square)	6 hours
Topic 7: Trigonometric Functions of any Angle	5 hours
Topic 8: Vectors and Oblique Triangles	9 hours

IV. REQUIRED RESOURCES/TEXTS/MATERIALS/SOFTWARE/TECHNOLOGY:

1. *Basic Technical Mathematics with Calculus* (10th Edition), SI Version, Allyn J. Washington. Addison-Wesley, Pearson, 2014. ISBN: 0133523667. Package includes MyMathLab with Pearson eText -- Access Card Package

(**Optional** *for the 10th Edition: Student Solutions Manual for Basic Technical Mathematics with Calculus, SI Version*, 10/E. ISBN: 0133982769 (Not bundled with text at this time).

OR

2. *Basic Technical Mathematics with Calculus* (9th Edition), SI Version, Allyn J. Washington. Addison-Wesley, Pearson, 2009. ISBN: 0132465612. Package includes MyMathLab and Student Solutions Manual.
3. Calculator: (Recommended)

   a) Electrical, Electronics, Computer Engineering – SHARP Scientific Calculator EL-506L
   b) Civil, Architectural Engineering – SHARP Scientific Calculator EL-531

   Note: The use of programmable calculators is restricted during the final exam.

4. Speakers and a sound card are required in order to access the lectures.

Students can purchase the books from www.textnet.ca

V. EVALUATION PROCESS/GRADING SYSTEM:

There are four online tests, each of equal value and weight and will be averaged out to a total of 48%. There is one proctored written final exam, valued at 48%. Participation is valued at 4 marks – 1 mark for each online test completed.

The online tests are open book.

Passing grade at Sault College is 50%. Your registering college will convert the percentage grade to the letter grade.

VII. SPECIAL NOTES:

1. If you are a student with a disability please identify your needs to the tutor and/or the Centre for Students with Disabilities at your registering college.
2. Students, it is your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.
3. Course outline amendments: The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.
4. Students should refer to the definition of "academic dishonesty" in Student Code of Conduct

(https://my.saultcollege.ca/). Students who engage in academic dishonesty will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, discuss with your course instructor the preferred documentation format for referencing source material.