

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: Technical Mathematics I

CODE NO. : MTH145 SEMESTER: One

PROGRAM: Engineering Technician and Technology Programs

AUTHOR: Mathematics Department

DATE: June PREVIOUS OUTLINE Sept 2010
2011 DATED:

APPROVED: "B. Punch"

CHAIR DATE

TOTAL CREDITS: 5

PREREQUISITE(S): None

HOURS/WEEK: 4

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**For additional information, please contact Brian Punch, Chair, Environment and Design
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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, and fractions. 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, second, to ensure that students acquire the mathematical and critical thinking skills necessary to analyze and solve engineering technology problems.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Basic Algebraic OperationsPotential Elements of the Performance:

1. Perform basic arithmetic operations on signed numbers.
2. Perform arithmetic operations using estimation.
3. Work with exponents and convert numbers between decimal, engineering, and scientific notation.
4. Work with roots and radicals.
5. Create algebraic expressions using addition, subtraction, division, and multiplication.
6. Solve for formulas and literal equations.
7. Apply word problems to solve algebraic operations.

2. Units of Measurement and Approximate NumbersPotential Elements of the Performance:

1. Perform basic arithmetic operations on approximate numbers.
2. Review and compare the metric (SI), imperial and US systems of measurement.
3. Work with and convert between the various units of measurement.

3. Geometry and Trigonometry

Potential Elements of the Performance:

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

4. More Trigonometry, Vectors and Oblique Triangles

Potential Elements of the Performance:

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, and determine angles in any quadrant.
3. Convert angles between radians, degrees and revolutions.
4. Determine the resultant of two or more vectors.
5. Resolve a vector into its components.
6. Solve applied problems requiring vectors.
7. Solve oblique triangles using the sine and cosine laws.
8. Solve applied problems requiring oblique triangles.

5. Analytic Geometry, Linear Equations, Factoring and Fractions

Potential Elements of the Performance:

1. Apply linear equations of one and two unknowns
2. Determine the slope and axis coordinates of linear equations.
3. Graph linear equations.
4. Review the definition of a straight line and how it correlates to geometric planes.
5. Define the point slope form of a linear equation.
6. Describe the characteristics of a circle and how it relates to a geometric plane.
7. Graphically solve systems of two linear equations in two unknowns by determinants.
8. Factor expressions by involving common factors and difference of squares.
9. Reduce algebraic fractions and formulas.

III. TOPICS:

1. Basic Algebraic Operations	12 Hours
2. Units of Measurement and Approximate Numbers	8 Hours
3. Geometry and Trigonometry	13 Hours
4. More Trig, Vectors and Oblique Triangles	17 Hours
5. Analytic Geometry, Linear Equations, Factoring and Fractions	10 Hours

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. **Basic Technical Mathematics with Calculus (9th Edition)
Washington, SI Version, Addison-Wesley, Pearson, 2010**
2. **Calculator:** -
 - i) SHARP Scientific Calculator EL-520W (Civil students),
 - ii) otherwise any scientific calculator.

Note: The use of some calculators and other electronic devices may be restricted during tests, quizzes and some assignments.

V. EVALUATION PROCESS/GRADING SYSTEM:

Evaluation will consist of two components:

Tests worth 70 %

Homework Assignments, In class Assignments, Quizzes worth 30%

Students must pass both the assigned work and test portion of the course to pass the entire course.

There will likely be 4 to 5 tests during the semester and the dates will be identified in class.

Review the Special Notes section of this course outline for the professors' rights and students' responsibilities with respect to the evaluation of tests, assigned work and quizzes.

The professor reserves the right to adjust the number of tests, assignments and quizzes as warranted. Any modifications will be discussed in class. Students with special needs and or circumstances are required to identify their specific needs with the professor.

Attendance is mandatory and the quizzes, in class and assigned work will only be marked when completed in class.

It is the students responsibility to notify the professor in advance of any absences and it will be at the professor's discretion to allow rewrites, retakes, modified assignments or quizzes where warranted.

Work is to be completed by the assigned dates and times. Failure to do so may result in zero grades for the assigned work.

Some of the assigned work may be provided and or completed through the internet via either LMS or MathXL software.

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

The Professor reserves the right to adjust the number of tests, assignments and quizzes as warranted. Any modifications will be discussed in class. Students with special needs and or circumstances are required to identify with the professor.

Attendance is mandatory in this course and the tests, quizzes, in class assigned work will only be marked when completed in class.

It is the students responsibility to notify the professor in advance of any absences and it will be at the professor's discretion to allow rewrites, retakes, modified assignments or quizzes where warranted.

Work is to be completed by the assigned dates and times. Failure to do so may result in zero grades for the specific assigned work.

Some of the assigned work may be provided and / or completed through the internet via either LMS or MathXL software.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.