

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



COURSE OUTLINE

COURSE TITLE: Technical Mathematics II

CODE NO. : MTH146-5 SEMESTER: 2 or 3

**PROGRAM: Engineering Technician and
Technology Programs**

AUTHOR: Mathematics Department

**DATE: Sept 2012 PREVIOUS OUTLINE DATED: Jan
2012**

APPROVED: "B. Punch" June/12

	CHAIR	DATE
TOTAL CREDITS: 5		
PREREQUISITE(S): MTH 145		
HOURS/WEEK: 4		

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I. COURSE DESCRIPTION:

This course is a continuation of MTH 145. Topics of study include variation, geometric applications that use variation and modeling, statistics, a more detailed view of exponents and radicals, quadratics, exponential and logarithmic functions

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:

Topic 1: Variation

1. Work with ratios and proportions of like and unlike units of measure.
2. Define what constants and variants are.
3. Study direct, inverse and joint variation.
4. Work with constants, variants and solve equations.

Topic 2: Geometric applications using variation and modeling

1. Solve practical problems to find the sides and angles of right triangles.
2. Solve practical problems to find the areas of a triangle or quadrilateral.
3. Solve problems involving the circumference, diameter, area or tangent
4. to a circle.
5. Compute surface areas and volumes of spheres, cylinders, cones and other solid figures.
6. Use geometric proportional models and variance to solve practical problems of determining lengths, perimeter, area and volume.

Topic 3: Statistics, probability and data analysis

1. Organize data into frequency distributions, frequency histograms or frequency polygons.
2. Define the various measures of central tendency such as arithmetic mean, median, and mode.
3. Calculate the arithmetic mean, median and mode when given specific data.
4. Study normal distribution and how it relates to determining standard deviation.
5. Calculate the range and standard deviation.
6. Define probability and how it relates to practical problem solving in real world applications.
7. Analyze data to determine probable trends.
8. Apply statistical process control to real world problems.
9. Apply the principles of linear and non-linear regression to practical examples such as predictive and preventative scenarios.

Topic 4: Exponents and Radicals

1. Use the laws of exponents to simplify and combine expressions having integral exponents
2. Work with fractional exponents.
3. Simplify radicals.
4. Apply mathematical operations to radicals.

Topic 5: Quadratic Equations

1. Describe the quadratic equation
2. Solve quadratic equations by factoring
3. Solve quadratic equations by completing the square
4. Use the quadratic formula to solve for the unknowns
5. Graphing the quadratic function.
6. Identify the parabolic shape and direction of the graph.
7. Identify the vertex and x/y intercepts of the graphed parabola.

Topic 6: Exponential and Logarithmic Functions

1. Define the exponential and logarithmic functions.
2. Graph logarithmic and exponential functions.
3. Identify the properties of logarithms.
4. Convert expressions between exponential and logarithmic form
5. Work with common and natural logarithms
6. Solve exponential and logarithmic equations

III. TOPICS

1. Variation	10 hours
2. Geometric applications using data and modeling	5 hours
3. Statistics, probability and data analysis	20 hours
4. Exponents and radicals	5 hours
5. Quadratic Equations	10 hours
6. Exponential and Logarithmic Functions	10 hours

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

1. Basic Technical Mathematics with Calculus and MathXL software (9th Edition) Washington, SI Version, Addison-Wesley, Pearson, 2010 ISBN: 9780132465623.
2. Calculator:
 - i) SHARP Scientific Calculator EL-520W (Civil students).
 - ii) Otherwise any scientific calculator.
3. MATH XL access that came with textbook
4. Instructor provided material and class notes

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

V. EVALUATION PROCESS/GRADING SYSTEM:

Evaluation will consist of two components:

Tests overall worth of 70 % toward the final grade.

Homework Assignments, In Class Assignments, Quizzes overall worth of 30% toward the final grade.

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. Each test will be worth the same weight towards the final test score. Each test will have the same worth and weight towards the final test portion of the score.

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.

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.

Attendance is mandatory and the 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 assigned work.

Some assignments must be completed within the assigned class time. Failure to attend the class may result in a zero grade or partial grades at the professor's discretion.

The following semester grades will be assigned to students in postsecondary courses:

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.	

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 MathXL software or LMS.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

The professor reserves the right to use other tools and/or techniques that may be more applicable. These other tools/techniques for effective communication will be discussed, identified and presented throughout the delivery of course content.

VII. COURSE OUTLINE ADDENDUM:

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