



**I. COURSE DESCRIPTION:** This ACE-credit course is designed to equip the student with the mathematical knowledge and skills needed for college technical programs. Students investigate and apply properties of polynomial, exponential, and logarithmic functions, solve problems involving inverse proportionality and explore the properties of reciprocal functions. The student will analyze models of a variety of functions, solve problems involving piecewise-defined functions and linear-quadratic systems. It is possible, but not assumed, that the outcomes of this course can be attained in one semester.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

1. Solve problems involving trigonometric principles  
Potential Elements of the Performance:
  - Solve problems using ratios and rates
  - Solve problems using trigonometric ratios in right-angled triangles
  - Solve problems using sine and cosine law
  - Recognize whether to use sine or cosine law in order to solve a problem
2. Solve and graph linear and quadratic equations  
Potential Elements of the Performance:
  - Recognize linear relations
  - Solve linear functions
  - Graph data
  - Graph quadratic functions
  - Solve quadratic functions by factoring and by using the quadratic formula
  - Simplify complex numbers
  - Solve linear and linear-quadratic systems of equations graphically and algebraically
3. Manipulate polynomials graphically and algebraically  
Potential Elements of the Performance:
  - Draw general shapes of polynomial functions for equations of different degrees
  - Graph polynomial functions with multiple roots
  - Determine the degree of a polynomial function by examining its finite differences
  - Factor a polynomial
  - Divide a polynomial by a binomial
  - Write polynomial functions that have given numbers as zero

- Sketch the graph of a polynomial function whose equation is given in factored form
4. Solve mathematical problems expressed as inequalities  
Potential Elements of the Performance:
    - Graph inequalities on a real number line
    - Solve linear inequalities
    - Solve factorable polynomial inequalities
  5. Solve problems involving direct and inverse proportionality  
Potential Elements of the Performance:
    - Determine the difference between direct and inverse proportionality
    - Investigate direct and inverse proportionality occurring in everyday situations
    - Construct tables of values, graphs, and formulas to represent functions of direct and inverse proportionality
  6. Manipulate rational, reciprocal and piecewise functions  
Potential Elements of the Performance:
    - Perform mathematical operations on rational expressions
    - Sketch graphs of the reciprocal of a linear or quadratic functionWrite, graph, and answer questions related to piecewise functions.
  7. Investigate and apply problem-solving skills to exponential and logarithmic functions  
Potential Elements of the Performance:
    - Identify properties of exponential functions
    - Identify whether a given graph is that of a polynomial or exponential function
    - Identify whether a situation displays exponential growth or decay
    - Apply exponential growth or decay to real-life problems
    - Identify the properties of logarithmic functions
    - Evaluate and simplify logarithmic functions
    - Apply logarithms to solve real-life problems

### III. TOPICS:

1. Trigonometric Functions
2. Linear and Quadratics Functions and Systems
3. Polynomials
4. Inequalities
5. Direct and Inverse proportionality
6. Rational, Reciprocal and Piecewise Functions
7. Exponential and Logarithmic Functions

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

Mathematics for College Technology. MCT4C-A, Units 1-4. 2004, The Ontario Educational Communications Authority

**V. EVALUATION PROCESS/GRADING SYSTEM:**

A unit test will be given following the completion of each unit. Each test must be passed by a mark of 66% or greater. The final mark will be based on the average of these four tests. ACE-level courses require an average of 66% or greater for a passing grade. The following semester grades will be assigned to students upon course completion:

*As modified from post-secondary programs.*

| <b>Grade</b> | <b><u>Definition</u></b>  |
|--------------|---|
| A+           | 90 – 100%   |
| A            | 80 – 89%  |
| B            | 70 - 79%  |
| F            | 69% and below   |
| 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. *<Optional: It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.>*

**Plagiarism:**

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. 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, it is the policy of the department to employ a documentation format for referencing source material.

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.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon demonstrating proof of same and at the discretion of the professor.