# Technical Mathematics I

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## Table of Contents

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## 1  Course Description

**Course:** 2030:151 Technical Mathematics I
**Credits:** 2
**Prerequisite:** Placement test or completion of 2010:052, 054, 057, or 084 with a grade of C or better.
**Bulletin Description:** Prerequisite: Placement test or completion of 2010:052, 054, 057, or 084 with a grade of C or better. Fundamental concepts and operations, functions, graphs, factoring and algebraic fractions, variation, and quadratic equations.

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## 2  Course Outcomes

After completing this course the student should have the following competencies:

1. the ability to solve basic algebra problems;
2. an understanding of functions and their graphs;
3. the ability to use basic factoring techniques;
4. an understanding of fractions with variables;
5. the ability to solve systems of linear equations;
6. the ability to solve quadratic equations.

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## 3  Course Outline

1. Basic algebra
   (a) Scientific notation
   (b) Algebraic expressions

    (c) Addition and subtraction of algebraic expressions
    (d) Exponents and radicals
    (e) Multiplication of algebraic expressions
    (f) Division of algebraic expressions
    (g) Linear equations
    (h) Formulas and their applications
2. Functions and graphs
    (a) Functions and function notation
    (b) Graphing functions and simple algebraic equations
3. Factoring
    (a) Special products: product of two binomials, square of a binomial
    (b) Factoring out a common factor
    (c) Factoring the difference of two squares
    (d) Factoring trinomials
4. Algebraic fractions
    (a) Equivalent fractions
    (b) Reducing fractions
    (c) Multiplication and division of fractions
    (d) Addition and subtraction of fractions
    (e) Complex fractions
    (f) Equations with fractions
5. Systems of linear equations
    (a) Solving a $2 \times 2$ linear system by graphing
    (b) Solving a $2 \times 2$ linear system by substitution
    (c) Solving a $2 \times 2$ linear system by elimination
6. Quadratic equations
    (a) Solving a quadratic equation by factoring
    (b) Solving a quadratic equation using the quadratic formula

# 4    Textbook

*OpenStax Algebra and Trigonometry.* OpenStax CNX, 2017. https://openstax.org/details/books/algebra-and-trigonometry.

**Chapter 1:** 1.1, 1.2, 1.3, 1.4, 1.5, 1.6
**Chapter 2:** 2.1, 2.2, 2.3, 2.5
**Chapter 3:** 3.1, 3.2
**Chapter 5:** 5.4
**Chapter 11:** 11.1

# 5    Calculator Policy

All students are **required** to have a **scientific** or graphing calculator with minimum functionality equivalent to that of the **Texas Instruments TI–30X IIS** calculator. Every student is **required** to have possession of their calculator by the end of the first week of classes. No

exceptions to this policy will be made by the instructor.

# 6    Formula Policy

*Some of the formulas that students will know by heart at the end of this course are listed below.*

**Factoring Formulas**

$$a^2 - b^2 = (a - b)(a + b)$$
$$x^2 + (a + b)x + ab = (x + a)(x + b)$$
$$acx^2 + (ad + bc)x + bd = (ax + b)(cx + d)$$

**Quadratic Formula**

Let $ax^2 + bx + c = 0$ where $a$, $b$, and $c$ are constants with $a \neq 0$.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$