

# **MTH 141 TECHNICAL MATHEMATICS II** (revised 11/16/2015)

The purpose of this course is to develop an intuitive feeling for mathematical methods without emphasizing mathematical rigor. The student will be expected to use algebra, trigonometry, and transcendental functions to solve practical problems from various technologies.

A comprehensive departmental final exam testing the degree of mastery of the following course objectives is required.

## **1. General objectives**

1.1 Review and build upon techniques learned in MTH 140 in the areas of dimensional analysis.

## **2. Complex Numbers**

2.1 Convert a complex number between rectangular and polar form algebraically.

2.2 Perform basic arithmetic operations on complex numbers.

2.3 Graphically represent complex numbers in rectangular form and polar form.

2.4 Find powers and roots of complex numbers.

## **3. Equations and Functions**

3.1 Review solving linear equations in one variable.

3.2 Review graphing linear functions.

3.3 Solve quadratic equations algebraically (using factoring, completing the square and the quadratic formula).

3.4 Graph quadratic functions.

3.5 Solve equations in quadratic form using substitution.

## **4. Systems of Equations and Inequalities**

4.1 Solve systems of two linear equations in two variables algebraically, graphically, and by using Cramer's Rule.

4.2 Solve systems of three linear equations in three variables using Cramer's Rule.

4.3 Solve linear-quadratic systems of equations in two variables algebraically and graphically.

4.4 Solve systems of two linear and/or quadratic inequalities in two variables graphically.

## **5. Polynomial Equations and Functions**

5.1 Divide a polynomial by a binomial using long division.

5.2 Use the Remainder Theorem to find the remainder  $P(a)$  when a polynomial function  $P(x)$  is divided by  $x - r$ .

5.3 Use synthetic division to find the quotient and remainder of the polynomial function  $P(x)$  when  $P(x)$  is divided by  $x - r$ , to determine whether a given number is a zero of  $P(x)$ , and to determine whether  $x - r$  is a factor of  $P(x)$ .

5.4 Given a polynomial equation and some of its roots, find the remaining roots.

5.5 Use synthetic division and other methods to solve higher degree polynomial equations.

## **6. Exponential and Logarithmic Functions**

- 6.1 Express logarithmic equations in exponential form.
- 6.2 Express exponential equations in logarithmic form.
- 6.3 Graph exponential and logarithmic functions.
- 6.4 Use a calculator to evaluate common and natural logarithms and antilogarithms.
- 6.5 Use properties of logarithms to rewrite expressions involving logarithms.
- 6.6 Solve exponential equations and logarithmic equations.

## **7. Inequalities in One Variable**

- 7.1 Solve a linear inequality in one variable and graph the solution on the real number line.
- 7.2 Solve compound linear inequalities and graph the solution on the real number line.
- 7.3 Solve factorable quadratic and higher degree inequalities and graph the solution on the real number line.
- 7.4 Solve inequalities involving rational expressions and graph the solution on the real number line.
- 7.5 Solve a linear absolute value inequality in one variable and graph the solution on the real number line.

## **8. Trigonometry**

- 8.1 Apply the Law of Sines and the Law of Cosines to practical problems.