HIGHLAND COMMUNITY COLLEGE

Syllabus
MAT103 Intermediate Algebra
3 Credit Hours (Lecture)
Prerequisites: MAT100 with a C or higher or Assessment
Revision Date: 11/12/2021

Department:

Mathematics

Course Description:

This course is a thorough study of the fundamental laws of algebra, including adding, subtracting, multiplying, dividing, factoring, and simplifying polynomial, rational, and radical expressions. The course also will cover solving linear, quadratic, rational, and radical equations, including non-real complex solutions, as well as solving linear, compound, and absolute value inequalities. In addition, graphing linear equations, inequalities, and quadratic functions, solving systems of two equations in two variables, and using function notation will be covered, as well as applications of many of these algebraic concepts. Other topics will be included as time permits. A scientific calculator is required for this course.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents. (Kansas Regents System Number and Title: **KRSN MAT1000 Intermediate Algebra.)**

Upon completion of the course, the student should be able to:

1. Demonstrate the ability to perform arithmetic and algebraic manipulation by
   a. Factor expressions completely using various techniques.
   b. Performing addition, subtraction, multiplication, and division on rational expressions.
   c. Simplifying complex fractions.
   d. Applying the laws of exponents to simplify expressions containing rational exponents.
   e. Applying the laws of radicals to perform addition, subtraction, and multiplication on expressions involving radicals and rationalizing denominators containing radicals.
   f. Simplifying radicals containing negative radicands and performing arithmetic operations on complex numbers.
   g. Evaluating functions using function notation.
2. Solve equations and inequalities
   a. Solve linear equations in one variable.
   b. Solve linear inequalities in one variable showing solutions both on the real number line, in interval notation, and in set-builder notation.
   c. Solve literal equations.
   d. Solve systems of linear equations in two variables.
   e. Solve equations by factoring and quadratic formula.
   f. Solve equations containing rational expressions.
   g. Solve equations involving radicals.
   h. Develop and solve mathematical models such as variation, mixture, motion, work, and geometrical applications.
   i. Solve absolute value equations.

   j. Solve compound and absolute value inequalities.
3. Produce graphs on a coordinate plane by
  a. Graphing linear equations and inequalities.
  b. Graphing functions, including linear and quadratic.
4. Analyze equations and graphs to
  a. Determine an equation of a line given sufficient information such as point and slope, two points, point and a perpendicular/parallel line.
  b. Calculate the distance between two points.
  c. Distinguish between functions and relations using the Vertical Line Test.
  d. Identify the domain and range of a function.

Course Content:

A. Arithmetic and Algebraic manipulations
1. Perform rules of exponent
2. Perform order of operations
3. Evaluate equations and expressions
4. Factor completely quadratics, quadratic-type forms, trinomials, special algebraic forms, and polynomials requiring factoring by grouping, and solve equations involving factoring.
5. Perform addition, subtraction, multiplication, and division on ordinary rational expressions and complex rational expressions.
6. Simplify and manipulate complex fractions.
7. Apply the laws of exponents to simplify expressions containing rational exponents.
8. Apply the laws of radicals to perform addition, subtraction, and multiplication of radical expressions, and simplify such expressions and rationalize denominators containing radicals.
9. Simplify radicals containing negative radicands.
10. Perform operations with complex numbers including addition, subtraction, multiplication and division

B. Equation and Inequalities
1. Solve linear equations and inequalities in one variable, express the answer of an inequality in both interval notation and inequality notation, and graph the answer on a number line.
2. Solve literal equations, including ones that require factoring.
3. Solve systems of linear equations in two variables by graphing, substitution, elimination
4. Solve Quadratic equations by using factoring, the square root property, the quadratic formula, and completing the square.
5. Solve equations containing both one radical and two radicals.
6. Solve absolute value equations and inequalities in one variable.

C. Graphs, Equations of Line, and Functions
1. Graph linear equations
2. Find slope of the line from two given points, equations and graphs
3. Write equation of line from slope and given points
4. Write equation of line from two given points
5. Write equation of vertical and horizontal line
6. Write equation of parallel and perpendicular line
7. Graph quadratic equations with key points
8. Define, identify function, Distinguish between functions and relations
9. Evaluate functions from equation, graphs and tables
10. Find Domain and Range of function
11. Find mid points from any given points

12. Find distance from given points
D. Applications: Solve word problems by developing mathematical models for both routine and non-routine types, including problems from business, economics, and consumer-related fields, as well as percentage, simple interest, mixtures, distance-rate-time problems, and problems with geometric applications.

Learning Assessments:

Competencies may be evaluated by multiple measures, including exams, quizzes, homework, discussions, and class activities.

Instructional Materials:

Textbook: Sullivan, M. & Struve, K. R. (2014). *Intermediate Algebra* (3rd ed). Boston, MA: Pearson. ISBN-13: 978-0321880123

Calculator: A TI series graphing calculator such as TI 83/84 is recommended but at least a scientific calculator is required.

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.