Course Syllabus
NCBM 0102- Non Course Based Mathematics

Catalog Description: Topics in mathematics such as arithmetic operations, basic algebra concepts and notation, geometry, and real and complex number systems.

Lecture hours = 0 Lab hours = 1

Prerequisites: Placement Examination (0-3 points of Passing TSI)

CoRequisite: Math 1332/1342

Semester Credit Hours: 1
Lecture Hours per Week: 0
Lab Hours per Week: 1
Contact Hours per Semester: 16
State Approval Code: 32.0104.53 19

Class section meeting time:

Core Components and Related College Student Learning Outcomes
This course counts as part of the academic requirements of the Panola College Core Curriculum and an Associate of Arts or Associate of Science degree. ☑ Yes ☐ No: If no, skip to Instructional Goals.

The items below marked with an X reflect the state-mandated outcomes for this course IF this is a CORE course:

☐ Critical Thinking Skills – to include creative thinking, innovation, inquiry and analysis, evaluation and syntheses of information
  ☐ CT1: Generate and communicate ideas by combining, changing, or reapplying existing information
  ☐ CT2: Gather and assess information relevant to a question
  ☐ CT3: Analyze, evaluate, and synthesize information

☐ Communication Skills – to include effective development, interpretation, and expression of ideas through written, oral, and visual communication
  ☐ CS1: Develop, interpret, and express ideas through written communication
  ☐ CS2: Develop, interpret, and express ideas through oral communication
  ☐ CS3: Develop, interpret, and express ideas through visual communication

☐ Empirical and Quantitative Skills – to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
  ☐ EQS1: Manipulate and analyze numerical data and arrive at an informed conclusion
  ☐ EQS2: Manipulate and analyze observable facts and arrive at an informed conclusion

☐ Teamwork – to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
TW1: Integrate different viewpoints as a member of a team
TW2: Work with others to support and accomplish a shared goal

Personal Responsibility – to include the ability to connect choices, actions, and consequences to ethical decision-making
PR1: Evaluate choices and actions and relate consequences to decision-making

Social Responsibility – to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities
SR1: Demonstrate intercultural competence
SR2: Identify civic responsibility
SR3: Engage in regional, national, and global communities

Instructional Goals and Purposes:
The purpose of this course is to increase academic proficiency in expression of mathematical solutions, mathematical reasoning, and mathematical understanding.

Learning Outcomes: [from the ACGM catalog]
After studying all materials and resources presented in the course, the student will be able to:

1. Define, represent, and perform operations on real and complex numbers.
2. Recognize, understand, and analyze features of a function.
3. Recognize and use algebraic (field) properties, concepts, procedures (including factoring), and algorithms to combine, transform, and evaluate absolute value, polynomial, radical, and rational expressions.
4. Identify and solve absolute value, polynomial, radical, and rational equations.
5. Identify and solve absolute value and linear inequalities.
7. Connect and use multiple strands of mathematics in situations and problems, as well as in the study of other disciplines.

[Panola College Outcomes – None Listed in ACGM]

Course Content:
A general description of lecture/discussion topics included in this course are listed in the Learning Objectives / Specific Course Objectives sections of this syllabus.

The objectives for this support are aligned with the Texas College Readiness Standards as adopted by the Texas Higher Education Coordinating Board. Students will only work on the skills which have been determined as individual weak areas as measured by a diagnostic pre-test.

Students in all sections of this course will learn the following content:

1) Numeric Reasoning
   a) To perform computations with real and complex numbers.
   b) To define and give examples of complex numbers.
   c) To use estimation to check for errors and reasonableness of solutions.
2) **Algebraic Reasoning**
   a) To explain and differentiate between expressions and equations using words such as “solve”, “evaluate”, and “simplify”.
   b) To recognize and use algebraic field properties, concepts, procedures, and algorithms to combine, transform, and evaluate expressions.
   c) To explain the difference between the solution set of an equation, the solution set of a system of equations, and the solution set of an inequality.
   d) To recognize and use algebraic field properties, concepts, procedures, and algorithms to solve equations and systems of linear equations.
   e) To interpret multiple representations of equations and relationships.
   f) To translate among multiple representations of equations and relationships.

3) **Geometric Reasoning**
   a) To recognize and apply right triangle relationships.
   b) To apply properties of geometric figures to solve problems.
   c) To make connections between geometry and algebra.

4) **Measurement Reasoning**
   a) To find the perimeter, area, surface area, and volume of two- and three-dimensional figures.
   b) To determine indirect measurements of figures using Pythagorean Theorem.

5) **Functions**
   a) To recognize whether a relation is a function.
   b) To recognize and distinguish between linear, quadratic, rational, and radical functions.
   c) To understand and analyze features of a function.
   d) To algebraically construct and analyze quadratic, rational, and radical functions.
   e) To apply quadratic, rational, and radical function models to real-world situations.
   f) To develop a quadratic, rational or radical function to model a situation.

6) **Problem Solving**
   a) To analyze given information, formulate a plan or strategy, determine a solution, justify the solution, and evaluate the problem-solving process.
   b) To formulate a solution to a real-world situation based on the solution to a mathematical problem.
   c) To use a function to model a real-world situation.

7) **Communication and Representation**
   a) To use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
   b) To use mathematical language to represent and communicate the mathematical concepts in a problem.
   c) To use mathematics as a language for reasoning, problem solving, making connections, and generalizing.
   d) To model and interpret mathematical ideas and concepts using multiple representations.
   e) To summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
   f) To communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, graphs, and words.
   g) To create and use representations to organize, record, and communicate mathematical ideas.
   h) To explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.

8) **Connections**
   a) To connect and use multiple strands of mathematics in situations and problems.
   b) To connect mathematics to the study of other disciplines.
c) To use multiple representations to demonstrate links between mathematical and real-world situations.

d) To know and understand the use of mathematics in a variety of careers and professions.

9) Operations with Real Numbers, Algebra, and Complex Numbers – Demonstrate skills in simplifying and evaluating numeric and algebraic expressions using the Order of Operations, Commutative, Associative, Additive and Multiplicative Identity, Additive and Multiplicative Inverse, and Distributive properties. Use the four properties of equivalent equations and use them to solve equations. Apply concepts of the real number line. Perform basic operations with complex numbers.

10) Solving Systems of Linear Equations – Identify the solution to a system of linear equations. Solve linear systems by graphing, substitution, and elimination. Translate real world situations into systems of linear equations.

11) Polynomials, Factoring, and Solving Quadratic Equations by Factoring – Use the rules of exponents to simplify expressions. Factor by dividing out a Greatest Common Factor, factor by grouping, factor trinomials, and factor special products. State the Principle of Zero Products and use it to solve quadratic and higher degree polynomial equations by factoring. Translate real-world situations into quadratic equations in order to solve problems involving area, perimeter, consecutive integers, and the Pythagorean Theorem.

12) Functions and Graphs – Define and recognize functions. Use function notation and evaluate a function for a given input value. Recognize and use multiple representations of functions such as equations, tables, graphs, and sets of ordered pairs. Identify the domain and range of functions, including: linear, quadratic, rational, and radical functions. Graph linear, quadratic, and select rational and radical functions. Identify the slope of a linear function and its intercepts. Identify the intercepts, vertex, and zeros of a quadratic function.

13) Roots, Rational Exponents, Radical Expressions and Equations – Find the square root of a number. Find selected higher order roots of a number. rational exponents to radical expressions. Decide whether a given root is rational or irrational. Add, subtract, and multiply radical expressions and simplify the results. Rationalize denominators. Solve radical equations and use them to model real world problems.

14) Rational Expressions and Equations – Define rational expressions. Determine when rational expressions and functions are undefined. Simplify rational expressions including complex fractions. Determine the Least Common Denominator of a set of rational expressions. Add, subtract, multiply, and divide rational expressions. Solve proportions and rational equations and use them to model real world situations.

15) Solving Quadratic Equations – Use the square root property and complete the square to solve quadratic equations. State the quadratic formula, identify the values of $a$, $b$, and $c$ in a quadratic equation. Use the quadratic formula to solve quadratic equations including equations containing fractions. Solve quadratic equations with a multiplicity of two. Use quadratic equations to model real world situations.

Methods of Instruction/Course Format/Delivery:

Methods employed will include Lecture/demonstration, discussion, problem solving, analysis, and/or reading assignments. A Study Plan will be assigned. Faculty may choose from, but are not limited to, the following methods of instruction:

1. Lecture
2. Discussion
3. Internet
4. Video
5. Television
6. Demonstrations
7. Field trips
8. Collaboration
9. Readings

Lab setting to execute assignments from an individualized study plan created from their personalized diagnostic. Individual tutoring/guidance will be given with study plan and credit level assignments.

Major Assignments/Assessment:

Faculty may assign both in- and out-of-class activities to evaluate students' knowledge and abilities. Faculty may choose from -- but are not limited to -- the following methods attendance, class preparedness and participation. Collaborative learning projects, exams/tests/quizzes, homework, internet, library assignments, readings, research papers, scientific observations, student-teacher conferences, and written assignments.

Assessment(s):

1. Individual Study Plan created from diagnostics

Course Grade:

<table>
<thead>
<tr>
<th>Assignment Weights</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance/Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Study Plan</td>
<td>90%</td>
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Letter Grades for the Course will be assigned as follows:
Completion of the study plan and progress in MATH1332 or MATH1342. The grade assigned will either be Pass or Fail.

Pass: 70 < Average < 100
Fail: 00 < Average < 70

Texts, Materials, and Supplies:

- My Math Test Access Code
- Canvas Access
- Scientific Calculator

Other:

- For current texts and materials, use the following link to access bookstore listings: http://www.panolacollegestore.com
- For testing services, use the following link: http://www.panola.edu/elearning/testing.html
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to http://www.panola.edu/student-success/disability-support-services/ for more information.
- Withdrawing from a course is the student’s responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.