Course Syllabus
Math 0332-Quantitative Reasoning Foundations

Catalog Description: This course supports students in developing skills, strategies, and reasoning needed to succeed in mathematics, including communication and appropriate use of technology. Topics include the study of numeracy and the real number system: algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving. Will not meet graduation requirements. Co-enrollment in MATH 1332-This intervention provides additional support and is required for students with prescribed TSI scores.

Prerequisites: Placement Score

Semester Credit Hours: 3
Lecture Hours per Week: 0
Lab Hours per Week: 3
Contact Hours per Semester: 48
State Approval Code: 32.0104.51 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...

1. Have instructional support while learning describing sets, subsets, and performing set operations.
2. Have instructional support while learning how to solve consumer math problems, including percents, loans, simple and compound interest, and mortgage payments.
3. Have instructional support while learning how to solve probability problems, including single- and multi-stage experiments.
4. Have instructional support while learning how to solve problems involving applications with permutations and combinations.
5. Have instructional support while learning to solve problems finding measures of central tendency, probability and statistics.
6. Have instructional support while learning how to solve problems discerning correct information from various types of graphs.

Learning Outcomes:
Upon successful completion of this course, students will:

1. Use appropriate symbolic notation and vocabulary to communicate, interpret, and explain mathematical concepts.
2. Define, represent, and perform operations on real numbers, applying numeric reasoning to investigate and describe quantitative relationships and solve real world problems in a variety of contexts.
3. Use algebraic reasoning to solve problems that require ratios, rates, percentages, and proportions in a variety of contexts using multiple representations.
4. Apply algebraic reasoning to manipulate expressions and equations to solve real world problems.
5. Use graphs, tables, and technology to analyze, interpret, and compare data sets.
6. Construct and use mathematical models in verbal, algebraic, graphical, and tabular form to solve problems from a variety of contexts and to make predictions and decisions.

Course Content:
The course content is aligned with the Career and College Readiness Standards as adopted by the Texas Higher Education Coordinating Board.
Students in all sections of this course will learn some of the following content:

1. Numeric Reasoning
   a. Number representations and operations
      i. Compare relative magnitudes of rational and irrational numbers, and understand that numbers can be represented in different ways.
      ii. Perform computations with rational and irrational numbers.
   b. Number sense and number concepts
      i. Use estimation to check for errors and reasonableness of solutions.
      ii. Interpret the relationships between the different representations of numbers.
   c. Systems of measurement
      i. Select or use the appropriate type of method, unit, and tool for the attribute being measured.
      ii. Convert units within and between systems of measurement.

2. Algebraic Reasoning
   a. Identifying expressions and equations
      i. Explain the difference between expressions and equations.
   b. Manipulating expressions
      i. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions).
   c. Solving equations, inequalities, and systems of equations and inequalities
      i. Describe and interpret solution sets of equalities and inequalities.
      ii. Explain the difference between the solution set of an equation and the solution set of an inequality.
      iii. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities.
   d. Representing relationships
      i. Interpret multiple representations of equations, inequalities, and relationships.
      ii. Convert among multiple representations of equations, inequalities, and relationships.

3. Geometric and Spatial Reasoning
   a. Figures and their properties
      i. Recognize characteristics and dimensional changes of two- and three-dimensional figures.
      ii. Form and validate conjectures about one-, two-, and three-dimensional figures and their properties.
      iii. Recognize and apply right triangle relationships including basic trigonometry.
   b. Transformations and symmetry
      i. Identify transformations and symmetries of figures.
      ii. Use transformations to investigate congruence, similarity, and symmetries of figures.
   c. Connections between geometry and other mathematical content strands
      i. Make connections between geometry and algebraic equations.
      ii. Make connections between geometry, statistics, and probability.
   d. Measurements involving geometry and algebra
      i. Find the perimeter and area of two-dimensional figures.
      ii. Determine the surface area and volume of three-dimensional figures.
      iii. Determine indirect measurements of geometric figures using a variety of methods.

4. Probabilistic Reasoning
   a. Counting principles
      i. Determine the nature and the number of elements in a finite sample space.
   b. Computation and interpretation of probabilities
      i. Compute and interpret the probability of an event and its complement.
      ii. Compute and interpret the probability of [conditional and] compound events.
   c. Measurement involving probability
      i. Use probability to make informed decisions.

5. Statistical Reasoning
   a. Design a study
i. Formulate a statistical question, plan an investigation, and collect data.

b. Describe data
   i. Classify types of data.
   ii. Construct appropriate visual representations of data.
   iii. Compute and describe the study data with measures of center and basic notions of spread.
   iv. Describe patterns and departure from patterns in the study data.

c. Analyze, interpret, and draw conclusions from data
   i. Analyze data sets using graphs and summary statistics.
   ii. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.
   iii. Make predictions using summary statistics.
   iv. Identify and explain misleading uses of data.

6. Functions
   a. Recognition and representation of functions
      i. Recognize if a relation is a function.
      ii. Recognize and distinguish between different types of functions.
   b. Analysis of functions
      i. Understand and analyze features of a functions.
      ii. Algebraically construct and analyze new functions.
   c. Model real-world situations with functions
      i. Apply known functions to model real-world situations.
      ii. Develop a function to model a situation.

7. Problem Solving and Reasoning
   a. Mathematical problem solving
      i. Analyze given information.
      ii. Formulate a plan or strategy.
      iii. Determine a solution.
      iv. Justify the solution.
      v. Evaluate the problem-solving process.
   b. Proportional reasoning
      i. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.
   c. Logical reasoning
      i. Develop and evaluate convincing arguments.
      ii. Understand attributes and relationships with inductive and deductive reasoning.
   d. Real-world problem solving
      i. Interpret results of the mathematical problem in terms of the original real-world situation.
      ii. Evaluate the problem-solving process.

8. Communication and Representation
   a. Language, terms, and symbols of mathematics
      i. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
      ii. Use mathematical language to represent and communicate the mathematical concepts in a problem.
      iii. Use mathematical language for reasoning, problem solving, making connections, and generalizing.
   b. Interpretation of mathematical work
      i. Model and interpret mathematical ideas and concepts using multiple representations.
      ii. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
   c. Presentation and representation of mathematical work
      i. Communicate mathematical ideas, reasoning, and their implications using symbols,
diagrams, models, graphs, and words.
ii. Create and use representations to organize, record, and communicate mathematical ideas.
iii. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.

9. Connections
a. Connections among the strands of mathematics
   i. Connect and use multiple key concepts of mathematics in situations and problems.
   ii. Connect mathematics to the study of other disciplines.

b. Connections of mathematics to nature, real-world situations, and everyday life
   i. Use multiple representations to demonstrate links between mathematical and real-world situations.
   ii. Understand and use appropriate mathematical models in the natural, physical, and social sciences.
   iii. Know and understand the use of mathematics in a variety of careers and professions.

Methods of Instruction/Course Format/Delivery: This course is offered in lecture/demonstration format. The students will participate by taking notes, working sample problems in class, doing online homework, and taking quizzes and exams online or on paper.

Major Assignments / Assessments:
The following items will be assigned and assessed during the semester and used to calculate the student’s final grade.

Assignments
1. Section homework assignments
2. Quizzes over homework and/or classwork
3. Exams covering the chapter material
4. Comprehensive final exam

Assessment(s):
1. Exams over the chapter material
2. Comprehensive final exam

Course Grade:
The grading scale for this course is as follows:
- Class Participation and Attendance-10%
- Homework/Quiz-15%
- Exams-55%
- Comprehensive final exam-20%

Letter Grades for the Course will be assigned as follows:
A: 90 < Average < 100
B: 80 < Average < 90
C: 70 < Average < 80
D: 60 < Average < 70
F: 00 < Average < 60
Texts, Materials, and Supplies:
- Canvas Access

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 Charles C. Matthews Student Center 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.