Course Syllabus

MATH 1351-Mathematics for Teachers II

Catalog Description: This course is intended to build or reinforce a foundation in fundamental mathematics concepts and skills. It includes the concepts of geometry, measurement, probability, and statistics with an emphasis on problem solving and critical thinking.

Lecture hours = 3, **Lab hours** = 0

Prerequisites: Math 1350, College Algebra or the equivalent

Semester Credit Hours: 3
Lecture Hours per Week: 3
Lab Hours per Week: 0
Extended Hours:1**--** Additional study is required outside posted class times.
Contact Hours per Semester: 64
State Approval Code: 27.0101.57 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. Competence in applying both inductive and deductive methods of reasoning.

2. Competence in using set notation and identifying the union and intersection of sets.

3. Competence in identifying functions and relations and their graphs.

4. Competence in using various numerical representations of the

   number system, including different bases and scientific notation.

5. Competence in solving problems using properties of the whole numbers.

6. Competence in solving problems using the properties of the integers and ordering the integers.

7. Competence in applying the rules of number theory to the integers.

8. Competence in solving problems using the properties of the rational numbers.

9. Competence in solving problems using the properties of the real numbers.

10. Competence in solving geometry problems involving area, volume, constructions and

    congruence, parallel and perpendicular lines and translations, and the metric system.

11. Competence in organizing and representing statistical data, measuring central tendencies, and

    solving problems involving permutations and combinations.

12. Competence in computing slope and distance, and then using this knowledge to write the

    equations of lines.

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

1. Apply fundamental terms of geometry such as points, lines, and planes to describe two and three dimensional figures.
2. Make and test conjectures about figures and geometric relationships.
3. Use a variety of methods to identify and justify congruency and similarity of geometric objects.
4. Perform geometric transformations.
5. Demonstrate fundamental probability techniques and apply those techniques to solve problems.
6. Explain the use of data collection and statistics as tools to reach reasonable conclusions.
7. Recognize, examine, and utilize the basic principles of describing and presenting data.
8. Perform measurement processes and explain the concept of a unit of measurement.
9. Develop and use formulas for the perimeter, area, and volume for a variety of figures.

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.

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

1. Define a rational number and be able to represent a rational number using manipulatives such as fraction circles, Cuisenaire rods or base ten blocks.

2. Simplify a rational number using the Fundamental Law of Fractions.

3. Add, subtract, multiply and divide rational numbers and be able to represent the operation using manipulatives.

4. Apply the properties of rational numbers to solve problems or equations.

5. Be able to order the rational numbers and discuss the property of "denseness" of the rational numbers.

6. Calculate the arithmetic mean of two rational numbers.

7. Identify the three types of decimals.

8. Write decimals as fractions in simplest form and write fractions as decimals.

9. Add, subtract, multiply and divide terminating decimals.

10. Convert a repeating decimal of a rational number.

11. Round repeating decimals to a given place value or a given number of significant digits.

12. Solve problems involving ratio and proportion.

13. Define percent and write decimals as percent's and percent's as decimals.

14. Solve problems involving percent's.

15. Prove that a number is "irrational using "proof by contradiction."

16. Approximate square roots using "Newton's Method" ("divide and average method").

17. Discuss the difference between "axiom" or "postulate" and "theorem."

18. Define basic geometric concepts based on point, line and plane.

19. Define and identify the various types of angles.

20. Define and identify the basic types of arcs.

21. Define and identify the basic types of triangles.

22. Define and identify the basic types of polygons.

23. Define and calculate the complement and supplement of an angle.

24. Discuss the difference between "equal" and "congruent."

25. Perform the basic compass constructions, constructing figures congruent to the following: a line segment, an angle, constructing a perpendicular and parallel segment.

26. Prove triangles are congruent using the congruence theorems.

27. Identify the types of angles related to parallel lines and apply the theorems to calculate angles related to parallel lines.

28. Identify the basic transformations: reflections, rotations and translations; and given a figure on graph paper, perform a given transformation.

29. Discuss the history of the metric system and the need for standardization of the metric system.

30. Calculate the perimeter and circumference of various polygons.

31. Calculate the area of various plane regions.

32. Identify the five classes of regular polygons.

33. Calculate the volume of various solid regions.

34. Convert from one metric unit to another.

35. Convert from Fahrenheit temperature to Celsius and vice versa.

36. Use the Pythagorean Theorem to find the length of a side of a right triangle.

37. Use the converse of the Pythagorean Theorem to identify the type of triangle: acute, obtuse, or right.

38. Solve problems using similar triangles and indirect measurement.

39. Interpret data from tables, charts and various types of graphs.

40. Given data, draw a table, chart or graph that best represents the data.

41. Calculate the mean, median, mode, range and standard deviation of a set of data.

42. Discuss the distribution of data as following the normal frequency curve or a skewed curve by looking at leaf plots or histograms.

43. Find the probability of a single-stage or multi-stage event.

44. Calculate the odds of occurrence of an event

45. Apply the definition of mathematical expectation of an event.

46. Apply the Fundamental Counting Principle to calculate probability.

47. Calculate the number of permutations of an event.

48. Calculate the number of combinations of n elements taken r at a time.

49. Label the coordinate plane, including axes, quadrants, and the origin.

50. Graph a linear equation using a table, including the x- and y-intercepts.

51. Define and identify increasing and decreasing functions.

52. Calculate the distance between points on a number line and in the coordinate plane.

53. Given two points calculate the slope of a line containing two given points.

54. Write the equation of a line in standard form given two points.

55. Write the equation of a line in slope-intercept form given two points.

56. Write the equation of a circle given the center and the radius.

57. Given the equation of a circle, identify the center and the radius.

Methods of Instruction/Course Format/Delivery:

Methods of Instruction/Course Format/Delivery: Methods employed will include Lecture/demonstration, discussion, problem solving, analysis, and reading assignments. Homework 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

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.

The Mathematics Department does not accept late work.

Assessment(s):

1. Exam per Chapter

2. Report/Project

3. Comprehensive Final Exam

Course Grade:

Assignment Weights	
Class Participation	10%
Homework/Quiz Average	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:
- Textbook: A Problem Solving Approach to Mathematics for Elementary School Teachers 11th Edition ISBN 9780321756664
- MyMathLab Access ISBN 9780321199911
- 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.
- Student Handbook, *The Pathfinder:* http://www.panola.edu/student-success/documents/pathfinder.pdf