MATH-1380: MATHEMATICS FOR ELEMENTARY AND MIDDLE SCHOOL TEACHERS II

Cuyahoga Community College

Viewing:MATH-1380 : Mathematics for Elementary and Middle School Teachers II

Board of Trustees:
2015-05-28

Academic Term:
2015-08-24

Subject Code
MATH - Mathematics

Course Number:
1380

Title:
Mathematics for Elementary and Middle School Teachers II

Catalog Description:
Second of two-semester sequence designed for elementary and middle school education majors. Emphasis on understanding ideas and concepts. Includes statistics, probability, measurement, geometric shapes, Euclidean geometry, coordinate geometry, transformational geometry, problem-solving strategies, and historical topics. Highlights applications to classroom, projects, and use of current technology, including scientific/graphing calculators and computers.

Credit Hour(s):
4

Lecture Hour(s):
4

Requisites
Prerequisite and Corequisite
MATH-1370 Mathematics for Elementary and Middle School Teachers I, or departmental approval: equivalent coursework.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms. Blackboard accessibility information is available at http://access.blackboard.com.

Eastern (216) 987-2052 - Voice
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts. Therefore, attendance is recorded in the following ways:

• For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.
• For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit. As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available at: http://www.tri-c.edu/student-resources/documents/studenthandbook.pdf. You must also comply with the College’s Zero Tolerance for Violence on College Property available at: http://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes

Course Outcome(s):
Collect, organize, display, analyze, and interpret data.

Objective(s):
1. Describe the population and sample in a survey.
2. Describe bias in a survey.
3. Construct a line plot and a stem and leaf plot.
4. Construct a line graph and a circle graph.
5. Plot information in a scatterplot and draw a regression line.
6. Find the mean, mode and median for a collection of numbers.
7. Construct a box and whisker plot.
8. Calculate the variance.
9. Find the standard deviation for data.
10. Calculate the z-scores.

Course Outcome(s):
Compute probabilities for simple and complex experiments.

Objective(s):
1. Describe the sample space for an experiment.
2. Calculate experimental probability.
3. Find the theoretical probabilities of the outcomes.
4. Use Pascal’s Triangle to find probabilities.
5. Evaluate expressions involving factorials.
7. Find the expected value of an experiment.
8. Find the odds in favor and against an event.
9. Find the probability given the odds.
10. Find conditional probabilities.

Course Outcome(s):
Describe and analyze two-dimensional and three-dimensional shapes.

Objective(s):
1. Find, sort, and construct two-dimensional and three-dimensional shapes.
2. Identify the characteristics of two-dimensional and three-dimensional shapes.
3. Complete basic geometric proofs.

Course Outcome(s):
Solve problems involving measurement, conversion of measurements, area, and volume.

Objective(s):
1. Compute and verify ratios using English measures.
2. Use dimensional analysis to convert units.
3. Find the length of line segments.
4. Find the perimeter and area of various figures.
5. Apply the Pythagorean theorem to applications of measurement.
6. Find the surface area and volume of three-dimensional figures.

Course Outcome(s):
Draw, construct, and describe geometrical figures and understand congruence and similarity.

Objective(s):
1. Complete proofs using properties of congruence.
2. Use similarity properties to find missing lengths in application problems.
3. Complete constructions using compass and straightedge.
4. Use Euclidean geometry to solve applied problems.
5. Complete proofs using Euclidean geometry along with compass and straightedge.

Course Outcome(s):
Use coordinate geometry to represent and examine the properties of geometric shapes.

Objective(s):
1. Use the distance formula to show three points are collinear.
2. Find the midpoint of a line segment.
3. Calculate the slopes of lines.
4. Find the equations of lines.
5. Graph equations and find their simultaneous solutions.
6. Find the equation of a circle.
7. Use coordinate geometry to solve applied problems.
8. Complete proofs using coordinate geometry.

**Course Outcome(s):**
Describe and examine the sizes, positions, and orientations of shapes under transformations.

**Objective(s):**
1. Describe transformations.
2. Find the measure of directed angles.
3. Find the image under transformation.
4. Use transformations to solve applied problems.
5. Complete proofs using transformational geometry.

**Course Outcome(s):**
Apply a variety of strategies to solve problems that arise in mathematics and other fields.

**Essential Learning Outcome Mapping:**
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

**Objective(s):**
1. Use and apply strategies of look for a formula, do a simulation, and use a model.
2. Use and apply strategies of use dimensional analysis and identify subgoals.
3. Use and apply strategies of use coordinates and use symmetry.

**Methods of Evaluation:**
1. Periodic exams
2. Quizzes
3. Homework
4. Cooperative group work
5. Project
6. Portfolio
7. Calculator/computer application problems
8. Comprehensive final exam

**Course Content Outline:**
1. Statistics
   a. Organizing and displaying data
   b. Charts and graphs
   c. Measuring central tendency
   d. Measuring dispersion
   e. Distributions
   f. Misleading graphs
   g. Sampling bias
2. Probability
   a. Simple experiments
   b. Computing probability in simple experiments
   c. Tree diagrams and counting techniques
   d. Probability tree diagrams
   e. Permutations
   f. Combinations
   g. Pascal’s triangle and combinations
   h. Probability using counting techniques
   i. Simulations
   j. Expected value
k. Odds
l. Conditional probability

3. Geometric shapes
   a. Recognizing geometric shapes
   b. Analyzing geometric shapes
   c. Symmetry
   d. Relationships between geometric shapes
   e. Triangles and quadrilaterals
   f. Points and lines in a plane
   g. Angles
   h. Angles associated with parallel lines
   i. Regular polygons
   j. Angle measures in regular polygons
   k. Tessellations
   l. Circles
   m. Planes, skew lines, and dihedral angles
   n. Polyhedra
   o. Curved shapes in three-dimensions

4. Measurement
   a. Nonstandard units
   b. Standard units in English and metric
   c. Dimensional analysis
   d. Length
   e. Area
   f. Pythagorean theorem
   g. Surface area
   h. Volume

5. Euclidean geometry
   a. Triangle congruence
   b. Triangle similarity
   c. Indirect measurement
   d. Fractals and self-similarity
   e. Constructions using compass and straightedge
   f. Geometric problem solving

6. Coordinate geometry
   a. Distance
   b. Slope
   c. Equations of lines
   d. Simultaneous equations
   e. Equations of circles
   f. Geometric problem solving

7. Transformational geometry
   a. Isometries
   b. Symmetry
   c. Escher-type patterns
   d. Similitudes
   e. Congruence
   f. Similarity
   g. Geometric problem solving

8. Problem solving strategies
   a. Look for a formula
   b. Do a simulation
   c. Use a model
   d. Use dimensional analysis
   e. Identify subgoals
   f. Use coordinates
   g. Use symmetry
Resources


"Ohio Journal of School Mathematics"

"Principles and Standards for School Mathematics"

"Teaching Children Mathematics; Mathematics Teaching in the Middle School; Mathematics Teacher; and Journal for Research in Mathematics Education"

Resources Other
Software:

Website:

Instructional Services
OAN Number:
TTMSL

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