



ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences and Business

COURSE: MTH 1010 Structure of Number Systems II

Date: Spring 2022

Credit Hours: 3

Complete all that apply or mark "None" where appropriate:

Prerequisite(s): MTH 0908 and MTH 0920 with a C or better

Enrollment by assessment or other measure? Yes No

If yes, please describe: By appropriate assessment.

Corequisite(s): None

Pre- or Corequisite(s): None

Consent of Instructor: Yes No

Delivery Method: **Lecture** **3 Contact Hours** (1 contact = 1 credit hour)
 Seminar **0 Contact Hours** (1 contact = 1 credit hour)
 Lab **0 Contact Hours** (2-3 contact = 1 credit hour)
 Clinical **0 Contact Hours** (3 contact = 1 credit hour)
 Online
 Blended
 Virtual Class Meeting (VCM)

Offered: **Fall** **Spring** **Summer**

CATALOG DESCRIPTION and IAI NUMBER (if applicable):

This course is the second course in a two-semester sequence. Topics of study include, but are not limited to, introductory geometry, measurement, probability, statistics, motion geometry, and coordinate geometry. This course is recommended for students majoring in elementary or junior high education. IAI equivalent: M1903

ACCREDITATION STATEMENTS AND COURSE NOTES:

None

COURSE TOPICS AND CONTENT REQUIREMENTS:

- I. Probability
 - A. How Probabilities Are Determined.
 - B. Multistage Experiments with Tree Diagrams and Geometric Probabilities
 - C. Using Simulations in Probability
 - D. Odds and Expected Value
 - E. Methods of Counting

- II. Statistics
 - A. Statistical Graphs
 - B. Measures of Central
 - C. Tendency and Variation
 - D. Abuses of Statistics

- III. Geometry
 - A. Basic Notions
 - B. Polygons
 - C. More about Angles
 - D. Geometry in Three Dimensions
 - E. Networks

- IV. Constructions, Congruence, and Similarity
 - A. Congruence through Constructions
 - B. Other Congruence Properties
 - C. Other Constructions
 - D. Similar Triangles and Similar Figures
 - E. Lines in a Cartesian Coordinate System

- V. Measurement Linear Measure
 - A. Areas of Polygons and Circles
 - B. The Pythagorean Theorem
 - C. Surface Areas
 - D. Volume, Mass, and Temperature

- VI. Motion Geometry and Tessellations
 - A. Translations and Rotations
 - B. Reflections and Glide Reflections
 - C. Size Transformations
 - D. Symmetries
 - E. Tessellation of the Plane

INSTRUCTIONAL METHODS:

Lecture

Class discussion, participation, activities

Audio-visual aids - calculator, document camera, computers, etc.

Written assignments (reflection journals, etc)

Quizzes and examinations

EVALUATION OF STUDENT ACHIEVEMENT:

Unit Tests
Comprehensive final exam
Projects
MyMathLab assignments
Quizzes

INSTRUCTIONAL MATERIALS:

Textbooks

Mathematical Reasoning for Elementary Teachers, 7th Edition, Long, DeTemple,
Millman, 2015
Student Access Kit for MyMathLab

Resources

A Problem Solving Approach to Mathematics, Billstein, Libeskind, Lott, Addison Wesley
Longman.
Mathematics: A Practical Odyssey, Johnson, Mowry, Brooks/Cole
The Nature of Mathematics, Smith, Brooks/Cole
Illinois Common Core Standards

LEARNING OUTCOMES AND GOALS:

Institutional Learning Outcomes

- 1) Communication – to communicate effectively;
- 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;
- 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
- 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies

1. Students will demonstrate knowledge of Probability.
 - 1.1. Students will be able to discuss the meaning of probability, event, outcome, and sample space.
 - 1.2. Students will be able to find the probability of given events.
 - 1.3. Students will be able to create multistage experiments with tree diagrams. Students will be able to use simulations in probability.
 - 1.4. Students will be able to find odds and expected values. Students will be able to use the fundamental counting principle.
 - 1.5. Students will be able to use permutations as a method of counting. Students will be able to use combinations as a method of counting.
2. Students will demonstrate knowledge of Statistics.
 - 2.1. Students will be able to summarize information using descriptive statistics.
 - 2.2. Students will be able to find measures of central tendency.
 - 2.3. Students will be able to find measures of variation.

- 2.4. Students will be able to use Box-and Whisker Plots. Students will be able to use Scatterplots.
3. Students will demonstrate knowledge of Geometry
 - 3.1. Students will be able to define and use basic geometric notions such as points, lines, planes, collinear points, segments, rays, coplanar points, coplanar lines, concurrent lines, parallel, skew lines, parallel planes, space, angles, acute, obtuse, right, straight, perpendicular, and dihedral angle.
 - 3.2. Students will be able to define and use plane figures such as closed curve, simple curve, polygon, diagonal, convex polygon, concave polygon, regular polygon, polygonal region, scalene, isosceles, equilateral, trapezoids, parallelograms, rectangles, kites, isosceles trapezoids, rhombuses, and squares.
 - 3.3 Students will be able to use theorems involving angles.
 - 3.4 Students will be able to discuss three dimensional figures such as polyhedron, prisms, pyramids, regular polyhedra, cylinders, cones, and spheres.
 - 3.5 Students will be able to use networks
4. Students will demonstrate knowledge of Constructions, Congruence, and Similarity.
 - 4.1 Students will be able to show congruence of triangles with the following properties: (SSS),(SAS),(ASA), and (AAS).
 - 4.2 Students will be able to use the triangle inequality.
 - 4.3 Students will be able to discuss circles including arc, center, and chord.
 - 4.4 Students will be able to discuss proportional triangles.
 - 4.5 Students will be able to construct a line segment, circle, angle, bisect a segment, bisect an angle, a perpendicular from a point, a perpendicular bisector of a segment, perpendicular to a line through a point on the line, parallel to a line through a point not on the line, congruent segment parts, inscribe some regular polygons in a circle, circumscribe a circle about a triangle and inscribe a circle in a triangle.
 - 4.6. Students will be able to determine if two polygons are similar.
 - 4.7. Students will be able to graph lines in the Cartesian coordinate system.
 - 4.8. Students will be able to find the slope and equation of lines.
 - 4.9. Students will be able to solve a system of equations graphically.
 - 4.10. Students will be able to solve a system of equations by substitution or elimination.
 - 4.11. Students will be able to find the line of best fit.
5. Students will demonstrate knowledge of Measurement.
 - 5.1 Students will be able to use the English system of measurement.
 - 5.2 Students will be able to compute area and volume.
 - 5.3 Students will be able to compute mass.
 - 5.4 Students will be able to use the metric system of measure.
 - 5.5 Students will be able to covert temperatures from Celsius to Fahrenheit and Fahrenheit to Celsius.
 - 5.6 Students will be able to find the distance between two points. Students will be able to use the Pythagorean Theorem.

- 5.7 Students will be able to compute the surface area.
- 6. Students will demonstrate knowledge of Motion Geometry and Tessellations.
 - 6.1 Students will be able to translate, rotate, half-turn, reflect, and glide reflect objects on a plane.
 - 6.2. Students will be able to transform objects based on size.
 - 6.3. Students will be able to recognize line symmetry, rotational symmetry, point symmetry, plane of symmetry.
 - 6.4. Students will be able to show and recognize tessellations.