



ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences and Business

COURSE: MTH 1010 Structure of Number Systems II

Date: Spring 2019

Credit Hours: 3

Prerequisite(s): 1) Math 0920 Intermediate Algebra Foundation of Stem mathematics and Math 0908 Geometry, both with a "C" or better, or the equivalent college course; or 2) Another approved placement option.

Delivery Method:

<input checked="" type="checkbox"/> Lecture	3 Contact Hours (1 contact = 1 credit hour)
<input type="checkbox"/> Seminar	0 Contact Hours (1 contact = 1 credit hour)
<input type="checkbox"/> Lab	0 Contact Hours (2-3 contact = 1 credit hour)
<input type="checkbox"/> Clinical	0 Contact Hours (3 contact = 1 credit hour)
<input type="checkbox"/> Online	
<input type="checkbox"/> Blended	

Offered: Fall Spring Summer

IAI Equivalent –**Only for Transfer Courses**-go to <http://www.itransfer.org>:

CATALOG DESCRIPTION:

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.

GENERAL EDUCATION GOALS ADDRESSED

[See last page for Course Competency/Assessment Methods Matrix.]

Upon completion of the course, the student will be able:

[Choose up to three goals that will be formally assessed in this course.]

- To apply analytical and problem solving skills to personal, social, and professional issues and situations.
- To communicate successfully, both orally and in writing, to a variety of audiences.
- To construct a critical awareness of and appreciate diversity.
- To understand and use technology effectively and to understand its impact on the individual and society.
- To develop interpersonal capacity.
- To recognize what it means to act ethically and responsibly as an individual and as a member of society.
- To recognize what it means to develop and maintain a healthy lifestyle in terms of mind, body, and spirit.
- To connect learning to life.

EXPECTED LEARNING OUTCOMES AND RELATED COMPETENCIES:

[Outcomes related to course specific goals. See last page for more information.]

Upon completion of the course, the student will be able to:

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.

MAPPING LEARNING OUTCOMES TO GENERAL EDUCATION GOALS

[For each of the goals selected above, indicate which outcomes align with the goal.]

Goals	Outcomes
First Goal	
To apply analytical and problem solving skills to personal, social, and professional issues and situations.	<ul style="list-style-type: none">• Students will demonstrate knowledge of Probability.• Students will demonstrate knowledge of Statistics.• Students will demonstrate knowledge of Geometry.• Students will demonstrate knowledge of Constructions, Congruence, and Similarity.• Students will demonstrate knowledge of Measurement.• Students will demonstrate knowledge of Motion Geometry and Tessellations.

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:

1. Lecture
2. Class discussion
3. Audio-visual aids
4. Written assignments
5. Quizzes and examinations

INSTRUCTIONAL MATERIALS:

TEXT: Mathematics Reasoning for Elementary Teachers, Long, DeTemple, and Millman, Pearson

STUDENT REQUIREMENTS AND METHODS OF EVALUATION:

1. Tests
2. Quizzes
3. Homework quizzes
4. Projects
5. Class Participation

A= 90-100

B= 80-89

C= 70-79

D= 60-69

F= 0-59

OTHER REFERENCES

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

Course Competency/Assessment Methods Matrix

(Dept/# Course Name)	Assessment Options																															
<p>For each competency/outcome place an "X" below the method of assessment to be used.</p>	Assessment of Student Learning	Article Review	Case Studies	Group Projects	Lab Work	Oral Presentations	Pre-Post Tests	Quizzes	Written Exams	Artifact Self Reflection of Growth	Capstone Projects	Comprehensive Written Exit Exam	Course Embedded Questions	Multi-Media Projects	Observation	Writing Samples	Portfolio Evaluation	Real World Projects	Reflective Journals	Applied Application (skills) Test	Oral Exit Interviews	Accreditation Reviews/Reports	Advisory Council Feedback	Employer Surveys	Graduate Surveys	Internship/Practicum /Site Supervisor Evaluation	Licensing Exam	In Class Feedback	Simulation	Interview	Written Report	Assignment
<p>Assessment Measures – Are direct or indirect as indicated. List competencies/outcomes below.</p>	Direct/ Indirect	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	I	I	I	I	D	D							
<p>1.1. Students will be able to discuss the meaning of probability, event, outcome, and sample space.</p>								X	X			X																				X
<p>1.2. Students will be able to find the probability of given events.</p>							X	X				X																				X
<p>1.3. Students will be able to create multistage experiments with tree diagrams.</p>							X	X				X																				X
<p>1.4. Students will be able to use simulations in probability.</p>							X	X				X																				X
<p>1.5. Students will be able to find odds and expected values.</p>							X	X				X																				X
<p>1.6. Students will be able to use the fundamental counting principle.</p>							X	X				X																				X