



Math 124

Math Structures and Concepts for Elementary Teachers II

Course Description

This course is designed for elementary education majors. Emphasis is placed on structure, meanings, relationships and types of thinking in elementary school mathematics. Informal geometry, tessellations, measurement, probability, and statistics are among the topics considered.

Illinois Articulation Initiative (IAI) number: M1 903

Credit and Contact Hours:

Lecture	3
Lab	0
Credit Hours	3

Prerequisites: Satisfactory placement test score or grade of “C” in Math 123 or equivalent.

Books, Supplies, and Supplementary Materials

A. **Required Textbooks**

MyMathLab Direct Digital Access. The eText is included in MyMathLab so if you are comfortable reading the textbook on the computer, you may use the eText alone. **There is no need to purchase a physical textbook for this course; the direct digital access fee for the eText was included in your course fees. Registration instructions are posted in our iCampus/Canvas site.**

B. **Other Required Materials**

Scientific calculator

C. **Methods of Instruction:**

Lecture, Hybrid, or Online

General Education Student Learning Outcome

1. Applied Knowledge: Students draw from learning experiences/concepts to solve a variety of problems or challenges.

Course Learning Outcomes (CLOs)

1. Explore Euclidean geometry including constructions.
2. Explore the principles of measurement.
3. Explore transformations, symmetry and tiling.
4. Explore properties of congruent and similar triangles.
5. Explore the basic principles of statistics and probability.

Lesson Learning Outcomes (LLOs)

Geometric Figures & Shapes

1. Determine if a polygonal curve is simple and/or closed
2. Determine if a polygon is convex or concave
3. Determine the numbers of faces, edges, and vertices of polyhedra
4. Differentiate regular polyhedra from non-regular polyhedra.
5. Give examples of real-life models of common 3-dimensional figures
6. Give examples of models of points, lines, and planes
7. Determine the intersections of lines and planes
8. Classify triangles according to lengths of sides and sizes of angles
9. Classify quadrilaterals according to lengths of sides, sizes of angles, and relationships among sides
10. Recognize properties of triangles and quadrilaterals
11. Classify angles
12. Determine the number of degrees in each angle of a regular polygon
13. Construct a regular polygon
14. Understand & use theorems involving angles i.e. supplements, complements, vertical angles corresponding angles, alternate interior and alternate exterior angles
15. To understand the Toolbox and Menu Bar for a graphing utility
16. To draw sketches with the geometry utility

Measurement

17. List sources of error in measurements
18. Find the perimeter (circumference) of a polygon (circle)
19. Find the area of a polygon, circle, or sector of a circle
20. Use the Pythagorean Theorem to determine whether a triangle is a right triangle or to determine the unknown side of a right triangle
21. Find the surface area and volume of polyhedra and cylinders and cones
22. Determine the effect of changing the length of sides on the area and volume of polyhedra and cylinders
23. Determine the appropriate units of length, area, volume, capacity, mass, and temperature in the English System and Metric system
24. Convert from one unit to another within the English System and Metric System

Transformations, Symmetries, and Tilings

25. Determine whether a figure is an image of another figure under a given slide, flip, or turn
26. Determine whether a figure has rotational, line, point, or plane symmetry.
27. Illustrate regular and semi-regular tessellation
28. Determine size transformation
29. Perform the following transformations: translations, rotations, reflections, and glide reflections

Congruence, Construction, and Similarity

30. Show that polygons are similar
31. Know the properties for congruence of two triangles
32. Understand the triangle inequality
33. Draw arcs and chords of circles
34. Know the relationships between parallel lines and segments
35. Demonstrate the following constructions:
36. Copy a line segment
37. Copy a circle
38. Copy an angle
39. Bisect a segment
40. Bisect an angle
41. Construct a perpendicular from a point to a line
42. Construct a perpendicular bisector of a segment
43. Construct a perpendicular to a line through a point on the line
44. Construct a parallel to a line through a point not on the line

45. Divide a segment into congruent parts
46. Inscribe some regular polygon in a circle
47. Circumscribe a circle about a triangle
48. Inscribe a circle in a triangle

Statistics and Probability

49. Select appropriate graphs to represent information
50. Select the appropriate measure of central tendency for a set of data and a given situation
51. Find the variance and standard deviation of a set of data
52. Analyze data using the normal curve and z scores
53. Find scores when given probabilities
54. Study the uses and abuses of statistics
55. Draw and analyze box plots including medians, quartiles, and extremes
56. Draw and examine scatter plots
57. Draw line plots and stem and leaf plots
58. Determine probabilities of simple and compound events
59. Determine odds and mathematical expectation of a given event
60. Use a table of random digits to simulate an experiment
61. Use the fundamental counting principle
62. Determine the number of permutations and/or combinations of an event

Final Course Grading Scale

Grade	Percentage
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	lower than 60%

Faculty Commitment

Faculty members are committed to providing a quality learning experience through thoughtful planning, implementation, and assessment of course activities. They are also committed to being readily available to students throughout the semester by returning e-mails and phone calls within 48 hours and to returning graded course work within a week. Furthermore, they are committed to selecting appropriate course materials and making them available in an organized and timely manner.

Student Commitment

For every credit hour a student is enrolled in, they should expect to spend at least 2 hours outside of class studying, working on assignments, and preparing for class each week of the fifteen-week semester. For example, for this three credit-hour class, students can expect to spend three hours per week in class actively engaged in learning the material by participating in face-to-face classes or viewing lectures and instructional material online. In addition, students should expect to spend another six hours per week outside of class completing homework and assignments, posting to discussion boards online, or studying for quizzes and tests. This means students should spend a minimum of 9 hours per week engaged in achieving the learning outcomes for this course. If you are not achieving your desired results in this class, you should consider increasing your prep time outside of class, in addition to using available resources such as instructor office hours and tutoring services.

By registering for this course, you commit yourself to active participation in course activities as well as the submission of all assignments and exams on time. Furthermore, you commit to accessing the course site and checking your JJC e-mail several times a week.