

Course: MATH 2223, Survey of Mathematical Structures II

Catalog Description: The fundamental element of this course is the understanding of the underlying concepts of elementary mathematics topics including counting methods, probability, statistics, geometry, measurement, and mathematical systems. Students in the course will prepare and present elementary math lessons and build team technology skills through the completion of an EAST project and/or prepare an independent research project related to elementary or middle school education. This course is designed for students planning to major in elementary education or middle school education at a senior institution. This course will not satisfy the math elective requirement for the Associate of Science degree at NWACC. Depending on the semester, computer-assisted, WWW, and hybrid versions of this course may be offered in addition to the traditional format.

Prerequisite: MATH 1204 with a grade of C or better, or appropriate placement scores.

Credit/Contact/Load Hours: 3 credit hours, 3 contact hours, 3 load hours

Target Audience and Transfer: This course is designed for students enrolled in certain education programs and/or majoring in Elementary or Middle School Education. This course will not satisfy the mathematics elective requirement to receive an AS degree.

Student Learning Outcomes

Upon successful completion of this course students should exhibit mastery of certain knowledge and basic skills. Successful Survey of Mathematical Structures II students will be able to:

1. Demonstrate understanding of basic geometric concepts including angles, congruence, and similarity
2. Calculate area and volume of polygons
3. Demonstrate understanding of measurement in both the English and metric systems
4. Exhibit understanding of counting techniques and compute basic probabilities
5. Distinguish statistical sampling techniques
6. Compute measures of central tendency and dispersion
7. Demonstrate understanding of mathematical systems
8. Prepare and present core mathematics lessons using some form of technology that can be incorporated into the EMPACTS program and/or submit an independent research project that incorporates technology.

Required Text: Math in Our World, Third Edition, Sobecki/Bluman

Required Text Coverage (for both standard lecture and WWW course):

- 7.1 The Rectangular Coordinate System and Linear Equations in Two Variables
- 7.5 Function
- 9.1 Measures of Length: Converting Units and the Metric System
- 9.2 Measures of Area, Volume, and Capacity
- 9.3 Measures of Weight and Temperature
- 10.1 Point, Lines, Planes, and Angles
- 10.2 Triangles
- 10.3 Polygons and Perimeter
- 10.4 Areas of Polygons and Circles
- 10.5 Volume and Surface Area
- 11.1 The Fundamental Counting Rule and Permutations
- 11.2 Combinations
- 11.3 Basic Concepts of Probability
- 11.4 Tree Diagrams, Tables, and Sample Spaces
- 12.1 Gathering and Organizing Data
- 12.2 Picturing Data
- 12.3 Measures of Average
- 12.4 Measures of Variation
- 12.5 Measures of Position
- 15.1 Mathematical Systems and Groups
- 15.2 Clock Arithmetic
- 15.3 Modular Systems

Recommended if time permits (for both standard lecture and WWW course):
7.2, 7.3, 10.6, 10.7, 11.5, 11.6, 11.7, 11.8, 12.6, 12.7, 12.8, Chapter 12 Supplement

A variety of application problems from each required topic should be assigned.

Required Instructional Activities: A project incorporating the above topics into an elementary mathematics lesson plan created by the student must be assigned in both lecture and WWW formats of the course. This project should include a technology component and preferably involve group dynamics. These projects may be created either inside or outside the EAST lab but should be of a quality that they may be incorporated into the EAST program.

Required Forms of Assessment: Each instructor will include a set of departmental final exam questions on his or her final exam. These questions will be in direct support of the Student Learning Outcomes 1-7. The questions will compose at least 10% of the students' overall grade in the course and will be graded according to a standard grading rubric. Student Learning Outcome 8 will be assessed via a common grading rubric developed by and made available to all faculty members. The results of the departmental questions, lesson project, and overall student performance will be reported when final grades are reported.

Instructor Resources:

- 1) Instructor's Annotated Edition
- 2) Instructor's Solutions Manual
- 3) Instructor's Testing Manual

Student Resources:

- 1) Student's Solutions Manual