SOUTHEAST MISSOURI STATE UNIVERSITY

SYLLABUS

MA641 Geometry and Measurement       Fall 2001

Catalog Description: In this course, students will use geometric concepts and relationships to describe and model mathematical ideas and real world constructs and understand measurable attributes of objects and the units, systems, and processes of measurement. The student will formulate questions that can be addressed with data and collect, organize and display relevant data. Credit only for The Missouri Cooperative Online Masters Degree in Teaching and Learning – Elementary Education.

Course Description: This course is designed to give students an opportunity to become familiar with content, instructional techniques and materials appropriate for teaching mathematics to elementary school students. Upon successful completion of this course, the student will have a deep understanding of the NCTM content standards: Geometry and Measurement.

Rationale: Teachers need a deep understanding of geometry and measurement in order to develop appropriate lesson plans and to be able to make connections to geometric concepts and relationships that describe and model mathematical ideas and real world constructs and the measurable attributes of objects.

Credit Hours: 3

Prerequisites: Successful completion of the program’s core courses and The Nature of Mathematical Thought.

Conceptual Framework:

Course Objectives: The student will:
A. gain knowledge of the application of informal concepts of the process of successive approximation, upper and lower bounds, and limit in measurement situations.
B. develop an understanding of the applications of transformational geometry.
C. gain insight into non-Euclidean geometries (i.e. spherical, taxicab, etc.)
D. use geometric ideas to solve problems.

Course Content: This course was developed in an outcomes-based format and was designed to conform to the 45 contact hours expectation common for three credit hour courses. The specific course content, outlined in the course objectives, will be delineated by the instructional design team and the instructor of record.
1) Transformational Geometry
   a) Dilations
   b) Reflections
   c) Rotations
   d) Translations
2) Euclidean and Non-Euclidean Geometries
   a) Van Hiele Levels
   b) Parallel Postulate
   c) Taxi-Cab Geometry
   d) Spherical Geometry
3) Process of successive Approximation
   a) Standard and Non-Standard Units
4) Problem Solving Using Geometric Ideas and Representations
5) Technology
   a) SketchPad
6) Proof and Reasoning
Methods of Instruction: Discussion forums, e-mail, online exams and quizzes, focused discussion, reflections on web-based research on teaching.

Portfolio Requirement: A portfolio module will be developed to give evidence of competencies addressed in this class. A possible suggestion for the portfolio module for this course is a geometry unit based on van Hiele research. Activities in the unit would span three consecutive van Hiele levels.

Research Component: An action research project based on the learning of measurement concepts and related issues.

Grading Policy: Specifics to be determined by the instructional design team and the instructor of record
- Instructional Unit 40%
- Research Papers 40%
- Participation in Online Discussion 10%
- Quizzes and Other Assignments 10%

Course Schedule: To be determined by the instructional design team and the instructor of record.

Textbooks (Title, Author, ISBN): Selected by the instructional design team and the instructor of record.
Suggested Texts:


Library Review: Periodicals to support research will be required to support the action research project.
Issues of Teaching Children Mathematics, Mathematics Teaching in the Middle School, Arithmetic Teacher (back issues), Mathematics Teacher, Journal for research in Mathematics Education, School Science and Mathematics


Other Required Software, Materials, and Equipment: Additional materials, such as SketchPad software, may be selected by the instructional design team and the instructor of record.

Statement on Non-Discrimination: Missouri’s public universities are equal-opportunity educational institutions and do not discriminate on the basis of race, color, national or ethnic origin, religion, sex, or sexual orientation for programs, activities, or employment, in accordance with the Civil Rights Act of 1964 and Title IX of the Educational Amendments.

Statement on Academic Honesty: Missouri’s public universities are committed to intellectual integrity in their academic pursuits. Academic dishonesty constitutes unacceptable behavior and includes unauthorized assistance in completing required course assignments or testing. Unauthorized assistance includes electronic transfer. Plagiarism, that is, submitting someone else’s work or part there of, as your own, is considered to be cheating.
Breaches if intellectual integrity will result in disciplinary measures, based on the policies and procedures of the student’s home instruction. These may include:
1) a failing grade for a particular assignment;
2) a failing grade for the course;
3) suspension for various lengths of time from the university; and/or
4) permanent expulsion from the university.

Statement on Student Disabilities: Reasonable accommodations will be provided upon request for persons with disabilities in accordance with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act of 1990. If you are a person with a disability, either learning related or physical, who requires an accommodation to participate in university programs, services, or activities, please contact the disability services staff at your university of record.

Expected Enrollment: 20-25

Special Fees: None

Bibliography:


