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A. Course Objectives:

1. Study appropriate content for teachers of high school algebra and trigonometry along with appropriate instructional and assessment techniques.

2. Include mathematical concepts, such as those contained in the NCTM and Colorado’s Content Standards in Mathematics, into the course.

3. Include the use computers and graphics calculators as tools for teaching and learning mathematics.

4. Provide both content and pedagogical content so that participating teachers are able to not only learn new content but are able to use appropriate tools and instructional methods in their classrooms.

5. Provide opportunities to develop curriculum materials for your classes.

B. Outline of Course Content:

1. Pedagogical Content

In small “chat” groups or as a class, we will discuss reading assignments, problem assignments and various techniques that might be appropriate for student understanding of mathematics. Two projects will be required. The first is an individual project and the second is a project in which you will work with one or two other members of our class. Keeping in line with new instructional roles in the teaching of mathematics, a variety of instructional methods will be adopted, including the use of technology. In particular, we will refer to graphic technology via both computer and calculator. I see myself taking on such roles as facilitator, coach, resource person, moderator, as well as presenter of new materials at various times during the semester.

- Online discussions and curriculum projects will ensue related to the integration of appropriate content into the secondary mathematics classroom. You are recommended to choose projects that you expect to use in your classrooms this semester or next.

- Online time will be devoted mainly to discussions and presentations.

1. Part of the semester will be devoted to discussion of common assignment and readings. All will participate as one group.

2. Part of the semester will be devoted to one individual report, individual presentation, and/or activity for all to participate - led by various class members.

3. Each of you will be responsible to develop and organize an activity that you will describe and present online. This can go into a portfolio, it can be associated with your project(s), and it will counts as credit toward the course grade.

2. Content of Course

The following content, as related the NCTM and State Standards, will be addressed in some form in this course: function concepts and difficulties that students have with them, problem solving and its significance in mathematics instruction, spreadsheet use for solving problems, use of graphic calculators and computer graphics software,
common mistakes make by students in algebra, differences between equation-function-formula, concept development within algebra and trigonometry, and real world applications of mathematics.

C. Required Text


D. Applicability of the Course Objectives to Recommendations of Professional Organizations and Associations

We will address recommendations that relate to the National Council of Teachers of Mathematics as standards of Algebra, Functions, and Trigonometry for grades 9-12, as well as standards of Patterns and Functions, and Algebra for grades 5-8. In particular in helping students to: Algebra (a) represent situations that involve variable quantities with expressions, equations, inequalities, and matrices; and (b) use tables and graphs as tools to interpret expressions, equations, and inequalities. Functions (a) model real-world phenomena with a variety of functions; (b) translate among tabular, symbolic, and graphical representations of functions; (c) recognize that a variety of problem situations can be models by the same type of function. Trigonometry (a) apply trigonometry to problem situations, involving triangles; (b) understand the connection between trigonometry and circular functions, and (c) apply graphing techniques to trigonometry functions. Patterns and Function (a) describe and represent relationships with tables, graphs, and rules; and (b) use patterns and functions to represent and solve problems. Algebra (a) apply algebraic methods to solve a variety of real-world and mathematical problems; and (b) solving linear equations using concrete, informal, and formal methods.
E. Assessment

A letter grade will be assigned based on the following:

1. Discussion Board entries – such as chapter and article write-ups, mathematical writings and problem solving.
2. Project (1 single, and 1 small group)
3. Online presentation of project(s)
4. Online discussions (quality and quantity)

F. Research References

Moses, B., Algebraic Thinking: Grades K-12, NCTM, 1999

Kieran, C. Chapter 17, "The Learning and Teaching of School Algebra", Handbook of Research on Mathematics Teaching and Learning, NCTM: 1992

Tall, D. Chapter 20, "The Transition to Advanced Mathematical Thinking: Functions, Limits, Infinity and Proof", Handbook of Research on Mathematics Teaching and Learning, NCTM: 1992

G. Bibliography

1. Primary Referenced Materials


Key Curriculum Press, 1996.


National Council of Teachers of Mathematics, Patterns and Functions, NCTM Addenda Series: Grades 5-8.


2. **Secondary Referenced Materials**


