MATH 361 – Mathematical Modeling of Science for Middle School Teachers

Fall 2009

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Text: *Precalculus-a study of functions and their applications* by Swanson, Andersen, and Keeley.

Prerequisites: A grade of "C" or better in Math 141 and Math 351.

Supplies: You will need a three-ring binder for your class notes and handouts. Colored pencils, a ruler, and a stapler are always handy. A graphing calculator is required for the course. I will be using a TI-84 Silver edition in class. Please use a pencil on all exams.

Course description and Goals: This is really a three pronged course: mathematics/science/technology. Mathematics will serve as the basis of the course and we will cover the following topics: Mathematical modeling, transformation of functions, data analysis skills, linear models, exponential growth and decay, logarithmic functions, logistic models, power and polynomial models, inverse and direct variation, periodic models, and trigonometric functions.

Through hands-on activities, science topics will be woven in, with, and under the mathematics topics. Energy, force, and motion will be recurring themes. We will study such things as the coefficient of restitution in a bouncing ball, pendulum motion, pressure at various depths, Newton's Law of Cooling, the motion of falling objects, light intensity, circular motion, sound, etc.

Technology will be a vital part of the course. You will make heavy use of graphing calculators and will also learn how to use the calculator based ranger (CBR), calculator based laboratory (CBL), TI-Connect, etc.

Instruction: Instruction will include lecture, demonstration, discussion, models, and hands-on activities in small and/or large group settings. We will be making use of inquiry-based learning, group and cooperative learning, technology, and hands-on activities. The knowledge you gain in regard to teaching strategies that incorporate these elements is just as important in today's mathematics and science teaching environments as the content knowledge you gain.

Attendance & Participation: There is no "official" attendance policy for this class; however, I do expect you to be present and to actively participate in each class session in order to gain understanding of the mathematical concepts that you will be expected to teach in an elementary setting. **You must be in class when it BEGINS in order to participate in a given class session!!** It has been my experience that you will not master the material without regular punctual class attendance. Attendance will be taken every class period.

Homework: Homework will be assigned most class periods. It is extremely important for you to work all homework in order to be prepared for the exams. **Late homework will NOT be accepted.** Homework assignments *must* be submitted in the following manner:

1. Your name will be prominently displayed on each page.
2. Exercise numbers will be prominently displayed.
3. Exercises will be submitted in the order in which they were assigned.
4. The pages will be stapled together.
5. You must show all work to receive credit.

If these conditions are not met, your work will not be evaluated; it will be returned to you with the assigned grade of 0.

Portfolio: You will be expected to keep a 3-ring binder with all activities, in class and assigned. Each activity must be completed. The portfolio will also have a section for reflections. Each class day must have a completed reflection. The portfolios will be taken up at various unannounced times throughout the semester. The portfolio must be turned in when requested or it will not be graded. Late portfolios will not be accepted. Further information about the portfolio will be communicated to you by the instructor.

Grading policy: Quizzes may be given and will average into your homework grade. Make-up quizzes will NOT be given. There will be two exams worth 150 points each, a group project, and a comprehensive final worth 250 points. You must bring a photo ID to every exam in order to be allowed to take the exam. Hats and cellphones will not be allowed on test days. **No make-up exams or quizzes will be given.** If you must miss an exam, you must contact the instructor **before** the exam. Failing to do so could result in a grade of 0 for the exam. The Final Exam will be discussed at a later date. Grades will be determined as described in the table below and assigned on the standard scale 90-100 A; 80-89 B; 70-79 C; 60-69 D; 0-59 F.

Homework, Quizzes, Portfolio	100 points
Projects	100 points
Exams	300 points
Final Exam	250 points

Dropping the course: The last day to drop this course is November 6.

Student Success: Your success in the course is entirely dependent on you. I will present the material using instructional strategies supported by recent research in mathematics education, however, the learning of such material is **YOUR** responsibility. You are expected to come to class ready and willing to learn, to be prepared for every class, and to participate fully in every class. This is not the kind of course where you can just sit back and listen and take a few notes. It is important that you be engaged in discussions, ask questions, and be actively involved in all activities in order to fully benefit from the course and indeed be successful in it.

Student Conduct: Students are expected to conduct themselves in a professional manner at all times. Classroom disruptions will **not** be tolerated. Classroom disruptions include (but are not limited to): coming to class late, leaving class early, talking off-topic, incessant chatting, and using electronic communication devices. Any student who disrupts a class session will immediately be asked to leave the classroom. Students who repeatedly disrupt class will be dropped from the course. No exceptions!! "All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (Student's Guide Handbook, Policies and Procedures, Conduct.)

Getting help: If you need help in the course, the first step should be talking with the instructor. The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Gee Library, Room 132. Phone (903) 886-5150 or (903) 886-5835; Fax (903) 468-8148.

Academic Dishonesty: Texas A&M University—Commerce has explicit rules and regulations governing academic dishonesty and academic misconduct. These policies are stated in detail in the Student's Guide Handbook. Each student is expected to read this document and abide by the contained policies. These university policies will be followed in this class. The minimum penalty for an act of academic dishonesty will be the assignment of a grade of 0 on the examination or homework assignment.

Working with another person or in study groups on problems can be helpful in learning the material. I encourage you to work together if you find it helpful. However, **all written work submitted must be your own**. Copying someone else's problem solution or showing your written solution to someone else is prohibited. In order to be successful in learning the material and doing well on the examinations you must think very hard about the problems themselves **before** discussing them with anyone else.

Remaining enrolled in this course constitutes acceptance of all policies contained in this syllabus.

Any changes in this syllabus will be communicated to you in class by the instructor.