Advanced Mathematical Decision Making (AMDM)

Mr. Khan Room # E223
akhan@atlanta.k12.ga.us

Syllabus **2011-2012**

Course Description: This is a course designed to follow the completion of Mathematics III or Accelerated Mathematics II. The course will give students further experiences with statistical information and summaries, methods of designing and conducting statistical studies, an opportunity to analyze various voting processes, modeling of data, basic financial decisions, and use network models for making informed decisions. (Prerequisite: Successful completion of Mathematics III or Accelerated Mathematics II)

AMDM is an engaging and rigorous course that prepares students for a range of future options in nonmathematics-intensive college majors or for entering workforce training programs; it may also be an appealing elective for students pursuing AP calculus. The course emphasizes statistics and financial applications, and it prepares students to use algebra, geometry, trigonometry, and discrete mathematics to model a range of situations and solve problems.

AMDM was designed by a diverse group of mathematics and education professionals, organized by the Charles A. Dana Center at the University of Texas at Austin, growing directly out of work by the Texas Association of Supervisors of Mathematics (TASM). The course represents a grassroots effort to address a widespread need for a high- quality, relevant, engaging mathematics course that students take to satisfy high school graduation requirements and prepare for future success after high school.

Course Overview: AMDM addresses a diverse set of topics, some of which are essential for future success and others that cover critical areas of mathematics not typically addressed in the high school mathematics program. AMDM is organized as follows:

Unit I: Analyzing Numerical Data
Unit II: Probability
Unit III: Statistical Studies
Unit IV: Using Recursion in Models and Decision Making
Unit V: Using Functions in Models and Decision Making
Unit VI: Decision Making in Finance
Unit VII: Networks and Graphs

The first semester of the course (Unit I, II, and III) focuses on advanced numerical reasoning, statistics, and probability. Unit III is a comprehensive treatment of how to make sense of statistical studies, including having students interpret published studies as well as design and conduct their own simple studies. This semester of in-depth study of statistical concepts is a critical building block for the units that follow in the second semester.

In the second semester, students experience a diverse set of topics, Unit IV through VII. The precise sequence of these four units is less critical than in the first semester, as the units tend to be less dependent on each other. However, Units IV and V together comprise a nice development of mathematical modeling that introduces students to recursion and extends what they know about using functions as models. Unit VI provides students with in-depth experience on advanced financial topics well beyond what we have seen in high school consumer math courses. Unit VII provides a glimpse into the world of discrete mathematics through networks and graphs, representing topics rapidly increasing in importance in our technological world. Students learn how to use unique forms of mathematical techniques, models, and approaches to deal with situations in business and computer science, among other fields.

Teaching and Learning Methodology and Philosophy: Throughout the year, there is a focus on learning through a constructivist approach. Patterns are used to clarify the major ideas and concepts of the course. Considerable time is spent making connections among the concepts and content studied. ***This course is designed by the pace of its students and requires students to be self regulated learners.*** AMDM allows students to explore unique problem situations that are not directly approachable through writing an equation or applying a common formula. Students are often required to visualize the situation through developing a model or

another form or representation. Other settings call for analyzing special cases or developing a solution by considering a simpler problem involving fewer cases.

Textbook & Supplementary Materials: There is no required textbook for this course. The instructional materials (student activities sheets) will be provided.

Required Materials: **THREE –RING BINDER NOTEBOOK**, pencil, **email, USB Flash Drive**, loose –leaf paper, graph paper are all required materials. A graphing calculator such as TI-83 or above is highly recommended.

Tutorial: Tutorials during the scheduled sessions are in groups setting. For individual help and/or peer tutoring, students must make an appointment.

Make-up Work: AMDM is a rigorous course and much of what we learn in this class will come from in-class projects, group discussions, and collaborative projects. *Regular attendance in this class is crucial to students' success.* It is the student's responsibility to turn in missing assignments and/or to schedule a make-up test with the teacher. Make-up work is allowed for excused absences only. Failure to make-up assignments or tests in the allotted time will result in a failing grade for that work. Absences due to school-initiated activities in which the student chooses to participate do not excuse the student from work assigned or concepts taught during the absence.

Grades are based on the APS Scale: A (100 – 90), B (89 – 80), C (79 – 70), F (69 – 0)

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45% Assignments: Graded individual and group class assignments are a major element on the course. Individual assignments are to be done **neatly in pencil** on 8 1/2 x 11 inch loose leaf or graph paper with the assignment clearly written on the top of the first page. Make an attempt to solve all assigned problems. Group assignments provide additional practice with the support of the instructor as well as other students. Student's class work will be graded on performance as well as completion. Various grading techniques will be used and effort will be used to evaluate development in some cases. ***CLASS PARTICIPATION****:* This is a very important part of any math course. Students are expected to work problems at the board, be prepared to answer questions, and participate in class discussions. ***SPONGES****:* Students will be required to do sponges for the purpose of reviewing previously learned topics or introducing new topics. ***NOTEBOOKS:*** All students will be required to keep a three-ring binder. This notebook binder should have at least 2 main sections: Class Notes & Materials and Graded Assignments. **Dates must be included** for each lecture. Notebooks will be checked periodically. It is the responsibility of the student to make sure all homework assignments, quizzes, class work activities, tests, and lecture notes are organized in this notebook. These assignments are a huge component of the **final project**.

40% **Assessments:** ***QUIZZES:*** Announced quizzes and unannounced quizzes will be given. ***TESTS:*** Tests will be given upon completion of a unit or combination of units. Students are allowed to make test corrections during scheduled tutorial. After grading the test, each test will be file in the student's record folder. ***MINI – PROJECTS:*** Projects may include, but are not limited to outside assignments requiring students to create artifacts relating to the application of mathematics in real life. Computer Lab assignments are also calculated as "projects, "

15% Final Project: A math portfolio contains samples of a student's work that is collected over a given length of time. A good portfolio offers insights to a student's thinking, understanding, and mathematical problem-solving skills, and thus offers a picture of the student's progress in math. A Math Portfolio is due at the end of the school year.

Submit Electronic assignments to ***Khan.math.help@gmail.com***

The course syllabus may change at the instructor's discretion.