ABRAHAM BALDWIN AGRICULTURAL COLLEGE

Syllabus

Course Name: MATHEMATICAL MODELING
Course Number: MATH 1101
Course Description: This course is an introduction to mathematical modeling using graphical, numerical, symbolic, and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results. Fall, Spring, Summer as needed. 3 credit hours.
Pre-requisites/Co-requisites: Prerequisite: Exemption from or successful completion of MATH 0099 and READ 0099.
USG General Education Outcomes pertinent to this course: **Quantitative Reasoning and Mathematics: quantitative reasoning and mathematics will be characterized by logic, critical evaluation, analysis, synthesis generalization, modeling, and verbal, numeric, graphical, and symbolic problem solving.** Competence within the context of collegiate general education objectives is defined by the following outcomes: o Ability to model situations from a variety of settings in generalized mathematical forms; o Ability to express and manipulate mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic form while solving a variety of problems; o Ability to solve multiple-step problems through different (inductive, deductive and symbolic) modes of reasoning; o Ability to properly use appropriate technology in the evaluation, analysis, and synthesis of information in problem-solving situations; o Ability to shift among the verbal, numeric, graphical and symbolic modes of considering relationships; o Ability to extract quantitative data from a given situation, translate the data into information in various modes, evaluate the information, abstract essential information, make logical deductions, and arrive at reasonable conclusions; o Ability to employ quantitative reasoning appropriately while applying scientific methodology to explore nature and the universe; o Ability to discern the impact of quantitative reasoning and mathematics on the sciences, society, and one's personal life.

ABAC Course Learning Outcomes: **Mathematical Modeling**

1. Solve applications using a variety of problem solving strategies including geometric and algebraic techniques
2. Apply basic statistical sampling techniques and apply the fundamentals of experimental design; students will calculate measures of central tendency and measures of variation and use these measures in appropriate ways to describe sets of date; given a set of data from real-world situations and computer spreadsheet software or pencil and paper, students will produce statistical graphs and use information from these graphs t make inferences and solve application problems
3. Solve applications involving linear equations, including interpreting the meaning of slope and intercepts, finding the line of best fit for a scatter plot, and systems of linear equations.
4. Given a non-linear equation of situation (especially quadratic, cubic, exponential, and logarithmic), construct tables of values, graph these functions, recognize significant features of the graphs (including vertices, symmetry, relative extreme intercepts, and asymptotes), and interpret the meaning of these significant features in the context of real-life applications
5. Given a chart of values or a scenario (either linear or non-linear), construct a scatter plot and curve of best fit, perform regression analysis, make predictions using the regression equation, and recognize significant features of the graphs

College Policy on Class Attendance:

ATTENDANCE

Courses at Abraham Baldwin Agricultural College are provided for the intellectual growth and development of students. The interaction with instructors and other students is an important element of the learning process, and a high correlation exists between class attendance and course grades. Therefore to attain maximum success, students should attend all their classes, be on time, and attend all scheduled course activities. Absence from class, for whatever reason, does not excuse a student from full responsibility for class work or assignments missed. Students must accept this responsibility.

Individual instructors will establish attendance policies for each class, will publish the policy in the course syllabus, and keep attendance records. The penalty for absences is at the discretion of the instructor and may include failure of the course. Whenever a student is absent, the student must assume responsibility for making arrangements for any assignments missed due to the absence.

A student who stops attending class without officially withdrawing will still receive a grade for the course.

A student penalized for excessive absences may appeal through the grade appeal process, as stated in ABAC's college catalog and student handbook.

INSTITUTIONAL ABSENCE

A student who serves as an official representative of the college is defined as one who:

- is authorized to use the college name in public relationships outside the institution;
- regularly interacts with non-college individuals and groups over an extended period of time (at least one semester);
- represents the college as a part of a group and not as an individual;
- represents the college under the direct supervision of a college faculty or staff member;
- is authorized, in advance, by the President of the college.

Such a student is in no way released from the obligations and responsibilities of all students, but will not be penalized with unexcused absences when absences result from regularly scheduled

activities in which he/she represents the college.

Further, it is the responsibility of each student to contact instructors prior to the absence and to make arrangements to make up any work that will be missed, in a manner acceptable to the instructor. Advisors of activities will schedule off-campus activities in a manner that does not unduly disrupt the learning process for a student.

http://www.abac.edu/catalog/2009_2010/AcademicPolicy.pdf

College Policy on Academic Dishonesty:

ACADEMIC CONDUCT CODE

A. Academic Dishonesty

Academic irregularities include, but are not limited to, giving or receiving of unauthorized assistance in the preparation of any academic assignment; taking or attempting to take, stealing, or otherwise obtaining in an unauthorized manner any material pertaining to the education process; selling, giving, lending, or otherwise furnishing to any person any question and/or answers to any examination known to be scheduled at any subsequent date; fabricating, forging, or falsifying lab or clinical results; plagiarism in any form related to themes, essays, term papers, tests, and other assignments; breaching any confidentiality regarding patient information.

B. Disciplinary Procedures

1. When a faculty member suspects that a student has engaged in academic dishonesty, the faculty member will contact the Office of the Vice President for Academic Affairs. The Vice President for Academic Affairs will notify the student in writing of the report and will appoint a neutral person from among the faculty or staff to meet with the faculty member who reported the matter and the student(s) believed to have engaged in academic dishonesty. The purpose of the meeting, to be scheduled by the Office of the Vice President for Academic Affairs, will be to provide a facilitated discussion about what may have occurred. The faculty member who reported the matter, the student(s) believed to have engaged in academic dishonesty, and the facilitator are the only participants in the meeting. Neither audio nor video recordings of these proceedings will be permitted. Following the discussion, the facilitator will submit a form summarizing results of the proceedings to the Office of the Vice President for Academic Affairs.
2. The faculty member and student(s) may reach an agreement about the matter and, if dishonesty is involved, may determine the appropriate consequences. If no resolution is agreed upon, the matter will be forwarded to the Dean of Student Life and Housing, who will convene the Student Judiciary Committee to determine the outcome of the allegation.
3. Guidelines for disciplinary procedures as outlined in Section V of the Student Code of Conduct will be applicable in cases involving alleged academic dishonesty. A written copy of the recommendations by the Student Judiciary Committee shall be sent not only to the student but also to the faculty member who made the allegations of academic dishonesty against the student, to the Vice President for Academic Affairs, and to the President.
4. Prior to any finding of responsibility on the part of the student, the faculty member shall permit the student to complete all required academic work and shall evaluate and grade all work except the assignment(s) involved in the accusation of dishonesty. The faculty member may, however, take any action reasonably necessary to collect and preserve evidence of the alleged violation and to maintain or restore the integrity of exam or laboratory conditions.
5. A student may not withdraw from a course to avoid penalty of plagiarism or other forms of academic dishonesty.

http://www.abac.edu/catalog/2009_2010/AcademicPolicy.pdf

If there is a student in this class who has specific needs because of learning disabilities or any other disability, please feel free to contact the instructor.
This is a partial syllabus. More detailed information relating to the class and Instructor will be made available to each student.

MATH 1101 **Mathematical Modeling Syllabus (2 Sections)** **Spring 2011**

Professor: Mr. Geoff Clement (gclement@abac.edu)
Phone: 391-5106 or -5100 (School secretary)
Office: Gray Hall, Room 114

Office hours: M–F 12-1 pm, F 8-11 am, AAC TR 1-2 pm, and other times by appointment
Location: CRN 30298 (MW 1:00-2:15 pm) Britt Hall, Room 103
CRN 30299 (TR 9:30-10:45 am) Gray Hall, Room 208

I. General Course Information/Objectives

Prerequisite: Math 0099 or exemption. 3 semester hours. Offered Fall, Spring, Summer.

Objective: This course is an introduction to mathematical modeling using graphical, numerical, symbolic and verbal techniques to describe and explore real-world data and phenomena. Emphasis is on the use of elementary functions to investigate and analyze applied problems and questions, supported by the use of appropriate technology, and on effective communication of quantitative concepts and results.

Course Outcomes — After successful completion of the course, students will be able to:

1. Model situations from a variety of settings in mathematical forms by extracting quantitative data from a given situation, translating the data into information in various modes, evaluating the information, extracting essential information, making logical deductions, and arriving at reasonable conclusions.
2. Manipulate mathematical information, concepts and thoughts in verbal, numeric, graphical and symbolic forms while solving a variety of problems.
3. Solve multiple-step problems through different (inductive, deductive, and symbolic) modes of reasoning.
4. Express mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic forms while solving a variety of problems.
5. Shift among the verbal, numeric, graphical, and symbolic models of considering relationships.
6. Use appropriate technology in the evaluation, analysis, and synthesis of information in problem-solving situations.

Units for the course include:

I	Problem Solving Strategies	II	Introductory Statistics
III	Linear Functions and Applications	IV–VI	Non-Linear Functions and Applications

Students enrolled in classes in the School of Science and Mathematics will be expected to demonstrate an understanding of subject matter requiring higher order processing skills. Examination questions may include essay, synthesis, analysis, and application; as well as completion, multiple choice, true/false and matching. Computational skills and drawing or diagramming may also be required. Learning disabilities should be brought to the instructor's attention and arrangements made for special needs the first week of classes. The wearing of baseball caps or other headgear on test days will not be permitted. Cell phones, pagers, and all other electronic communication devices must be turned OFF during each class or laboratory session.

Students are expected to:

- arrive for class with proper tools (text book, notebook, pencil, calculator)
- keep personal phone out of sight and on silent during class time (speak with your instructor before class should you experience an emergency)
- refrain from cursing during class
- be in class on time (School policy: two tardies count as one absence)
- treat faculty in a kind and courteous manner
- complete assignments on the assigned date
- be attentive and actively participate in class
- wear no hats or other head gear on exam day

Repercussions – students will be asked to leave class and will be marked absent for the day if:

- they arrive in class without tools
- they are found sleeping, cursing, or engaging in disruptive behavior
- they are texting or receiving phone calls during class (except for emergencies)

Faculty are expected to:

- begin class on time
- be prepared for class (text book, markers, calculator, handouts)
- treat students in a kind and courteous manner
- provide students with a schedule of events

All members of the ABAC community have an obligation to promote an atmosphere in which teaching and learning can take place in an orderly and efficient manner. To maintain this learning environment, individuals must refrain from behavior that disrupts the teaching and learning process. In order to assure the rights of all students to benefit from time spent in class, faculty members have the right and responsibility to excuse from a class session any individual whose behavior disrupts the teaching and learning process. Serious or continued infractions may result in referral of the student for disciplinary action by the student judiciary or appropriate administrative officer.

II. Materials

A. *Mathematical Modeling: An Introduction to College Mathematics*, Clement, 2010. [Copies of this textbook can be purchased in our bookstore.]

B. We suggest that you purchase graph paper, a separate folder with pockets for your portfolio, plus a 3-ring binder for the textbook.

C. The TI-83 or TI-84 Plus graphing calculator is required for this course.

D. i>clicker remote [These will be used for attendance and in class participation "quizzes".]

E. The Academic Achievement Center is open Monday- Thursday 8 am-10 pm and Friday 8 am-1 pm. This Center is located below the Baldwin Library in ABAC's Carlton Center.

III. Learning Resources

Read your book. Ask your instructor for help in class and outside of class. We will schedule extra help sessions when the need arises. There is free tutorial help available from the Academic Achievement Center. *If there is any student in this class who has special needs because of learning disabilities (or any*

other kind), please feel free to come and discuss this with me. Reasonable accommodations will be made to students who have proper documentation and inform the instructor at the beginning of the course.

Keys to Success in this class:

1. Have a goal for this class. Make this class a priority. You can succeed in this class!

2. Be on time every day. Don't miss class; when you must, communicate to your instructors.

3. Review class notes just before and just after class.

4. Read the text. Study the examples. Keep up with the pace of the class.

5. Practice, practice, and then practice some more. Do homework as soon as possible after class.

6. Ask questions. You have the right; asking questions shows you care and will often help others.

7. Read the directions carefully. On tests, start by "unloading" important formulas and concepts.

8. Actively listen in class. Take good notes.

9. Use our tutoring center whenever you need help. Don't let things snowball.

10. Correct any mistakes you make on quizzes and tests.

11. Be a lifelong learner. Live and learn! Rise to the challenge of college-level mathematics!

IV. Academic Responsibility

Students are urged to pay careful attention to ABAC's statement of "Academic Dishonesty" found in the college catalog (online). It is unacceptable to claim the work of someone else as your own. Academic dishonesty will not be tolerated and will be addressed appropriately.

V. Grades and Grading

A student's grade in the course will be determined by individual test scores, quizzes, and daily assignments. Each student will keep a portfolio with assigned problems, i>clicker participation questions, projects, and journal entries (together worth 100 points). All daily assignments are due during class with a 20% penalty for assignments coming in late on the same day and a 0 for all missed deadlines. We will also have quizzes (together worth 100 points). We'll have 4 exams (each worth 100 points) and a comprehensive final exam (worth 200 points). The student's final grade will then be computed out of a total of 800 points. The final exam may also be substituted for the lowest hourly exam. Your course grade will then be decided according to the following scale (after rounding):

90	-	100 %	=	A
80	-	89 %	=	B
70	-	79 %	=	C
60	-	69 %	=	D
Below 59 %			=	F

<u>Bonus Points</u> —

1 point for each community service hour (up to 5 hours and 5 points):
The service must benefit a "not for profit" organization and must be voluntary.

1 point each for attending/participating in ABAC functions (up to 5 activities and 5 points):
E.g., a Student Success workshop, an athletic event, a club meeting, etc.

VI. COLLEGE POLICY ON CLASS ATTENDANCE

Courses at Abraham Baldwin Agricultural College are provided for the intellectual growth and development of students. The interaction with instructors and other students is an important element of the learning process, and a high correlation exists between class attendance and course grades. Therefore to attain maximum success, students should attend all their classes, be on time, and attend all scheduled course activities. Absence from class, for whatever reason, does not excuse a student from full responsibility for class work or assignments missed. Students must accept this responsibility. Individual instructors will establish attendance policies for each class, will publish the policy in the course syllabus, and keep attendance records. The penalty for absences is at the discretion of the instructor and may include failure of the course. Whenever a student is absent, the student must assume responsibility for making arrangements for any assignments missed due to the absence.
A student who stops attending class without officially withdrawing will still receive a grade for the course. A student penalized for excessive absences may appeal through the grade appeal process, as stated in ABAC's college catalog and student handbook.

Students whose number of absences is more than three times the number of class meetings per week (i.e., more than 6 absences) will receive a grade of "F" for the course. Your instructor will not include in a student's absences those absences incurred due to authorized and approved College sponsored events (or, in the case of joint-enrollment students, high-school sponsored events) in which the student represents the institution as part of a group or under the direct supervision of a faculty or staff member. Generally, attendance will be taken within the first few minutes of the official starting time of the class. If the student is not in his/her seat at that time, an absence will be recorded. At the end of the class period, it is the responsibility of the student to communicate his/her attendance to the instructor so that a recorded absence may be changed to a tardy. **Math Science School Policy: For attendance purposes, two tardies will count as an unexcused absence.** A tardy can occur at the start and at the end of class. Be punctual!

Whenever a student is absent, whether for official or personal reasons, the student must assume responsibility and provide notice to the instructor, preferably in advance, for making arrangements for any assignments and class work missed because of the absence. However, final approval for makeup work remains with the individual instructor.

Students are expected to attend class each session. A record of your attendance will be kept and details will be sent to the Registrar with your final grade. There will be no make-up exams without an excused absence. Make-ups should be scheduled within a week of the test date or the return to school. Please inform the instructor if you will be arriving late or leaving early for a particular class or if you have an emergency which requires you to leave the classroom to answer your phone.

VII. Withdrawals from Class

For Session courses, a student may withdraw from a course up to the midpoint of the term **(March 2**) and receive the grade of "W" without penalty. After this midterm, a student may withdraw only with the permission of the Academic Dean. If permission is granted, the student will be assigned "W" or "WF" according to their average at the time they withdraw. A student who simply abandons their classes will be given an "F" at the end of the semester. To withdraw from a course, a student should see their advisor and their instructor to get drop forms filled out and signed. The student will follow the instructions on the form and process the forms with the Registrar's office.

Do your best! Keep the pace! Rise to the challenge! Live and learn!