Mathematical Modeling and Problem Solving

Instructor: Dr. Ianna West

Office: Peltier 106-B No on-campus office hours.
Online Office Hours: Monday-Thursday 10:00am – 12:00 noon. Available for consultation online via email daily or by appointment online.
Email: ianna.west@nicholls.edu
Office Phone: 985-448-4394

Section: WWW
http://www.cengage.com/cengage/productlist.do?disciplinenumber=1&courseid=MA07&codeid=2BA6&sortBy=copyrightYear&sortByShow=all

Other Course Materials: Access to a computer with internet is required; Maple Software highly recommended. A word processing software such as Microsoft Word is highly recommended; otherwise the student must have access to a scanner or fax machine to submit completed homework.

Prerequisites: MATH 265 (Calculus III), MATH 355 (Differential Equations) and MATH 402 (Mathematical Statistics).

Catalog Description: Use of previous course work to construct models for various problems in the sciences, managerial sciences, or other related areas.

Topics:
1. Introduction to modeling.
3. Analytic methods of model fitting.
4. Qualitative modeling with functions.
5. Discrete probabilistic modeling.
6. Discrete optimization modeling.
7. Modeling with dimensional analysis.

**Topics are subject to change**
Student Outcome Objectives:

1. Given a real world scenario, the student will be able to identify a problem, make assumptions and collect data, propose a model, test the assumption, and refine the model as necessary.
2. Given a model, the student will be able to work backward to uncover the implicit underlying assumptions, assess critically how well those assumptions fit the scenario, and estimate the sensitivity of the conclusions when the assumptions are not precisely met.
3. Student will be able to apply the fundamental laws of nature to given situations that will aid in the construction of models.
4. Student will be able to develop models of phenomenon that changes over time, both over discrete time periods and when the behavior is taking place continuously.
5. Student will be able to develop and solve dynamical systems.
6. Student will examine how to produce descriptions of systems, and then develop the tools for extracting information, make predictions from these descriptions and analyze the effects various situations have on it.
7. Student will be able to develop methods of model fitting to a collection of data.
8. Student will be able to develop solutions using a range of analytical techniques applying calculus, linear algebra, differential equations, and/or probability.

Course Content and Requirements

Hardware and Software Requirements:
The course will be conducted via internet using Blackboard and the students’ Nicholls email address. Lecture notes, course documents, homework assignments, grades and all other materials pertaining to the course will be available on Blackboard.

The URL for the university’s distance learning website is [http://www.nicholls.edu/distance/](http://www.nicholls.edu/distance/). Facts about internet courses can be viewed at the FAQS site [http://www.nicholls.edu/distance/faqs/](http://www.nicholls.edu/distance/faqs/). A download for minimum computer requirements for taking a course on Blackboard can be found in the last question on the FAQS site given above. A Blackboard Tutorial can be viewed at [http://www.nicholls.edu/distance/blackboard-tutorial/](http://www.nicholls.edu/distance/blackboard-tutorial/). A word processing software such as Microsoft Word is highly recommended to complete homework assignments.

On-Campus Meeting Requirements: Students will be required to meet on-campus to take the final exam if he/she lives within a reasonable driving distance of the campus. Distance learners must locate a testing facility near his or her home that must be approved by the instructor. Examples of approved testing centers are universities, community colleges or military testing centers, as well as testing centers such as Sylvan Learning Center.

Distance Learning Information: Copies of the distance learning Proctor Approval Form and Test Administration Form are available with the syllabus. These forms are only for students who will take the exam off-campus. The distance learning student must locate a testing center, and must complete the Proctor Approval Form at the beginning of the semester to be approved by the instructor. The student is responsible to schedule the exam with the proctor once the center has been approved. The Test Administration Procedure Form is attached only for your information. This form will be sent by the instructor to the approved testing center approximately a week before the exam and is to be filled out by the test administrator and returned to the instructor before the day of the test.
Method of Evaluation

**Homework:** Exercises will be assigned from each section. Students are required to complete all homework assigned to ensure an understanding of the concepts. The homework assignments are worth 60% of the grade. The student will have approximately one week to complete each assignment. The instructor will upload the homework assignment to the Assignment feature of Blackboard. Once the assignment is completed the student will be required to upload his or her assignment in the assignment feature of Blackboard. The instructor will not accept homework assignments via email. Homework assignments will be graded and feedback will be uploaded to Blackboard where the student may access his or her feedback. Instructions for acquiring and uploading assignments will be given later.

**Final Exam:** There will be a final exam worth 40% of the total grade. As stated above, students who live out-of-state, or students who do not live within a reasonable driving distance to the Nicholls’ campus, may request an alternative location (an approved testing center) to take the exam. **Arrangements need to be made by the student in advance.**

**On-campus Final Exam—Thursday, July 29, 2010 @ 1:00 PM**

**Grade**
Grade will be calculated on a ten point grading scale 90-100 A, 80-89 B, 70-79 C, 60-69 D, below 60 F.

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<tr>
<th>Homework</th>
<th>60%</th>
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<tbody>
<tr>
<td>Final Exam</td>
<td>40%</td>
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**Distribution of points may change during the semester**

**Make-up Procedure:** To make up the final exam, student must have a valid written excuse resulting from an emergency situation. Students representing the university in any official capacity will be granted valid excuses and will be allowed to make up an exam. Official documents must be provided to make up the final exam.

**Behavioral Policy:** Students must at no time be disrespectful toward the instructor. Students must behave in a professional manner at all times. Failure to act in an appropriate manner will not be tolerated and will be handled according to the guidelines outlined in the Code of Student Conduct.

**Attendance Policy:** Participation in at least one activity in which an electronic record which clearly indicates time and date of activity must be submitted. For financial aid purposes, student must complete at least one activity, which is equivalent to having attended a class at least once.

**Academic Honesty Policy:** Cheating will not be tolerated. Sanctions for academic cheating, plagiarism, and forgery of academic documents including signing another's name (Sec 1.9) are those outlined in the Code of Student Conduct handbook. Section 5 of the Code of Student Conduct, ‘Academic Dishonesty and Disruptive Behavior,’ includes a requirement that faculty file a charge complaint statement with their respective dean whenever a student is confronted or disciplined for cheating. The Office of Academic Affairs will maintain these records, and any student confronted and/or disciplined for multiple offenses of academic dishonesty will be brought before the Academic Affairs Integrity Committee for further review and potential sanctions. Please read the Code of Student Conduct for further details regarding this policy.
Continued Learning following an Extreme Emergency:
In order to make continued learning possible following an extreme emergency;

**Students are responsible for:**
- reading regular emergency notifications on the NSU website;
- knowing how to use and access Blackboard (or university designated electronic delivery system);
- being familiar with emergency guidelines;
- evacuating textbooks and other course materials;
- knowing their Blackboard (or designated system) student login and password;
- contacting faculty regarding their intentions for completing the course.

**Faculty are responsible for:**
- their development in the use of the Blackboard (or designated) software;
- having a plan for continuing their courses using only Blackboard and email;
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses;
- making adjustments or compensations to a student’s progress in special programs with labs, clinical sequences or the like, only in the immediate semester following the emergency.

**Academic Grievances:**
The proper procedure for filing grade appeals or grievances related to academic matters is listed in Section 5 of the Code of Student Conduct and at the following link: [http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf](http://www.nicholls.edu/documents/student_life/code_of_conduct.pdf).

**Americans with Disabilities Act:** If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services for coordination of our academic accommodations. The Office of Disability Services is located in Peltier Hall, Room 100-A. The phone number is (985) 448-4430 (TDD 449-7002).

The last day to drop this course with a “W” is Wednesday, July 7, 2010.