



MATH 4260, Mathematical Modeling, Fall 2012
MWF 10:00am - 10:50am HS200 CRN84058

Instructor Information

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Office Hours: TR 1:00pm - 2:00pm and 3:30pm - 5:00pm
MWF 1:00pm - 3:00pm (or by appointment)

Course Description

MATH 4260 Mathematical Modeling

3 class hours 3 Credits

Prerequisite: MATH 2403

This course introduces the student to the study and development of mathematical models to describe a wide range of phenomena from the natural and social sciences. Applications may include business, population growth, predator-prey, epidemics and a variety of physical phenomena; may also include student motivated projects and computer simulation of models.

Course Learning Outcomes

After successful completion of the course the student will be able to:

1. Develop a mathematical model to describe a situation or phenomenon from the natural or social sciences.
2. Analyze a model of interest, its underlying assumptions and its applicability.
3. Determine mathematical conclusions, its sensitivity to the assumptions made, and its interpretation in real-world scenarios.
4. Model change with difference equations.
5. Use proportionality and geometric similarity to construct mathematical models.
6. Apply analytical and graphical methods to model, fit, and interpolate data.
7. Model phenomena using differential equations (e.g. population growth, water pollution, drug dosage).
8. Model phenomena using systems of differential equations and use graphical analysis to study the solutions (e.g. competitive hunter, predator-prey, combat models and arms race).
9. Optimize continuous models.

General Education Outcomes

In addition to the course learning outcomes, this course will also address these College general education outcomes and competencies:

CRITICAL THINKING

Students will demonstrate higher levels of critical-creative thinking by analyzing problems, identifying viable solutions when possible, and defending choices of solutions:

- Identify, summarize, and analyze data, ideas, or concepts,
- Apply formula, procedures, principles, or themes,
- Draw well supported conclusions, and
- Synthesize ideas into a coherent whole.

MATHEMATICAL

Students will demonstrate mathematical competencies and problem solving skills:

- Model situations from a variety of settings in generalized mathematical forms,
- Express and manipulate mathematical information, concepts, and thoughts in verbal, numeric, graphical and symbolic form while solving a variety of problems,
- Solve multiple-step problems through different (inductive, deductive, and symbolic) modes of reasoning,
- Properly use appropriate technology in the evaluation, analysis, and synthesis of information in problem-solving situations,
- Shift among the verbal, numeric, graphical and symbolic modes of considering relationships,
- 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,
- Discern the impact of quantitative reason.

Textbook and Related Materials

- Giordano, Fox, Horton, and Weir, *A first course in Mathematical Modeling*, 4e, Brooks/Cole 2009. ISBN 978-0-495-01159-0. (**required**)
- Graphing calculator (**required**) (Recommended : TI-83/84 Plus)
You *may not use a cell phone as a calculator*.

Tentative Course Schedule

Chapters	Week No. (approx)
Chapter 1 Modeling Change	1
Chapter 2 The Modeling Process, Proportionality and Geometric Similarity	3
Chapter 3 Model Fitting	5
Chapter 11 Modeling with a Differential Equation	7
Chapter 12 Modeling with Systems of Differential Equations	10
Chapter 13 Optimization of Continuous Models	12
Further Explorations:	
Experimental Modeling, Simulation Modeling, Graphs of Functions as Models.	14

Method of Evaluation

Weights

Homework and small projects	30%
Exam 1 (Ch. 1, 2, 3) (Fri 09/28/12)	15%
First Project (Wed 10/17/12)	20%
Exam 2 (Ch. 11, 12, 13) (Fri 11/16/12)	15%
Final Project (Wed 12/05/12)	20%

Grades

90%-100%	A
80%-89%	B
70%-79%	C
60%-69%	D
0%-59%	F

Exams

If a student is not able to attend to an exam, he/she should inform me at least 3 days in advance to arrange a makeup exam. *No contact means No Makeup, No Credit.*

Homework and small projects

Homework and small projects will be assigned on Fridays and collected on Wednesdays. **No late homework will be accepted.**

ExtraCredits

Class participation will be rewarded with Extra Credit Points.

Attendance and Participation

Students are expected to read each section prior to class. Attendance is not required, but very recommended in order to get a full understanding of the subject. Please feel free to ask any questions at any time during class; there are no “*dumb*” questions, most of the time the rest of the class want to ask the same question.

Student e-mail and Communication

All students are provided with an e-mail account. This account is created 24 hours after students register for classes the first time. There is no charge for this service. Electronic mail is used heavily on campus for communicating all kinds of information. To find out your e-mail address, go to <http://www.ccgga.edu/current/technology/> click on the link to COAST and, once logged in, click on “Student Information”. You will then see the link related to e-mail information.

At the College of Coastal Georgia, e-mail is an OFFICIAL means of correspondence between the College and its students. The College of Coastal Georgia e-mail messages with official College announcements are transmitted to students using their College e-mail addresses. Check your College e-mail regularly or make sure it is forwarded to an active, private e-mail account that you use. For students without personal computer access, the computer lab in the Clara Gould Library and the library at the Camden Center is available.

Course Evaluations

Course evaluations are completed (online via COAST) by the student during the specified time period before final exams.

Academic Honesty Policy

Academic honesty is expected at all times.

A student shall not cheat or be dishonest in any way in his/her academic work. Examples of such dishonesty would include but not be limited to plagiarizing materials presented as the student’s own work, including failure to cite materials in a manner approved by the faculty, obtaining or attempting to obtain any course materials in an unauthorized fashion, providing course quiz, examination, or other materials from graded class activities in an unauthorized manner to another student. The faculty may exact penalties for instances of academic dishonesty. Further details on academic dishonesty are addressed in the college catalog.

Student Conduct Policy

Students at CCGA are expected to conduct themselves responsibly and to pursue their studies with integrity. By enrolling at CCGA, students agree to comply with the College’s rules and regulations. The College reserves the right to take necessary and appropriate action to protect the safety and well-being of the campus community. For further information, refer to the College Catalog and Student Handbook.

Electronic Devices Policy

The carrying and use of personal electronic devices (cell phones, iPods, laptops, etc.) are allowed on the campuses of CCGA. The use of these devices must not disrupt the functions of the College overall and its classrooms and laboratories. Faculty members also may have strict individual course policies related to personal electronic devices outlined in their syllabi in order to provide and maintain a classroom environment that is conducive to learning. If personal electronic devices are used inappropriately for the purposes of cheating or academic dishonesty, students who do so will be penalized appropriately under the Academic Honesty policy of College of Coastal Georgia. See complete policy in the College Catalog.

Withdrawal Policy

Students may withdraw from a course before the published deadline in the Academic Calendar on the CCGA website. The student will receive a grade of “W” or “WF” depending on the determination of the course instructor, the course grade at the time and the circumstances of the withdrawal. It is the student’s responsibility to withdraw. Students who stop attending class without formally withdrawing will receive a final grade of “F”, which will appear on the transcript, be included in the GPA, and may affect your financial aid. Refer to the CCGA catalog for further details.

Services for Students with Disabilities

The Office of Disability Services coordinates and provides a variety of services for students with physical and learning disabilities. Qualified students with documented disabilities are eligible for reasonable accommodations under the Americans with Disabilities Act. Students who need information should contact the Director of Counseling and Student Support, located in the Andrews Student Services Building, 2nd floor. Camden students may get information from the Student Services coordinator at Camden. For more information, call (912) 279-5802 (Brunswick) or 912-510-3300 (Camden). For further information refer to the College Catalog.

Tobacco Free Campus Policy

The College of Coastal Georgia prohibits the use of tobacco products on any property owned, leased, or controlled by CCGA. All faculty, staff, students, visitors, vendors, contractors, and all others are prohibited from using any tobacco products i.e. cigarettes, cigars, smokeless tobacco, snuff, chewing tobacco, etc while on CCGA property.

Children on Campus Policy

It is the goal of the College of Coastal Georgia to provide a safe and effective learning environment for all students. Any action which interferes with this goal will not be permitted. Children under the age of sixteen (16) who are not a currently enrolled CCGA student must not be left unattended at any time on campus, including in campus building, on campus grounds, or in a vehicle, and must be under the direct supervision of a legal guardian at all times. Parents or guardians of children considered disruptive or unsupervised will be asked to remove the children from the campus immediately.

Reserve Clause

The instructor reserves the right to make adjustments in the tentative schedule if necessary; any change will be informed to the students in a timely manner.