Catalog Description
Mathematical models of interactions among players: people, companies, nations, or genes. Concepts include strategy, preferences, equilibrium, efficiency, solutions, and fairness properties. Applications to biology, business, economics, politics, psychology, and theology are explored. Math 250 and Math 350 are taught simultaneously. Math 250 emphasizes modeling and application of techniques and has a prerequisite of Math 170. Math 350 emphasizes derivation and justification for game theory techniques and has a prerequisite of Math 211 and either Math 205 or 212.

Learning Objectives
The student will
1. Model real-world scenarios as games and interpret game solutions in the context of the scenario;
2. Analyze games using a variety of solution concepts and mathematical techniques;
3. Prove or disprove conjectured properties of games and solutions;
4. Learn mathematics by reading, listening, exploring, and conversing in an effective manner;
5. Explain and critique mathematical reasoning through speaking and writing in a precise and articulate manner in both informal and formal settings;
6. Exhibit curiosity, playfulness, creativity, confidence, perseverance, interest in multiple perspectives, and a collaborative spirit.

Instructor
David Housman, SC 117, dhousman@goshen.edu, 535-7405, 875-0339 (home)
Office hours at http://people.goshen.edu/~dhousman/Schedule13Fall.htm

Class Time
TR 8:00-9:15 a.m. in SC 107.

Textbook

On-line

Software
Wolfram Mathematica will be used for computation and is available from any lab computer. If desired, you can purchase or rent a student license for your personal computer at http://www.wolfram.com/mathematica/how-to-buy/education/students.html.

Notebook
A three-ring binder with loose-leaf lined and graph paper is recommended so that you can keep a written record of problem solving attempts, questions, math discoveries, and skill assessments.

Activities
The study of mathematics is not a spectator sport! Reading, listening, solving problems, writing explanations, reflecting upon ideas, and receiving feedback are essential to learning mathematics. Read with paper and pencil in hand, and take an anticipatory approach: try to obtain solutions, explanations, and proofs before reading what the author provides.

An average student can obtain an average grade with an average of nine hours each week devoted to this course—adjust if you are not average or desire a grade that is not average.

Moodle will announce the reading and assignments for each week. Class will complement your preparatory reading and investigating through mini-lectures, game playing, discussions, and problem solving.
Grading

Course grades will be based on performance on participation (10%), assignments (60%), and a project (30%).

Participation

Come to class and fully engage in the activities. Contributions to class discussion, success in game play, and performance on quizzes will be the factors considered in your grade.

Assignments

Achieve and exhibit understanding by completing the assigned exercises. Complete the weekly assigned exercises by 8:00 a.m. on Tuesdays. They will be graded and returned with feedback during class on Thursday. Revised solutions to individual exercises may be resubmitted the following Tuesday along with your original submission; a 30% penalty will be assessed on resubmissions. A core set of exercises will be assigned for all students. Math 250 students may be assigned additional computational or modeling exercises. Math 350 students may be assigned additional proof oriented exercises.

Project

Examine some topic in greater depth, either individually or collaboratively. The final product will include a paper and a class presentation scheduled during the final exam period. Potential topics, mechanics, and grading criteria will be discussed as the semester progresses and will be negotiated with individual students.

Extra Credit

Receive extra credit toward your assignments grade by doing one or more of the following: (1) find errors in the text or posted course materials and describe the error in writing; (2) attend a quantitative presentation (e.g., Science Speakers) or participate in a quantitatively based activity and describe in writing some interesting mathematical aspect of the presentation or activity; or (3) participate in a Career Services event and describe your most important discovery. The description should be a substantive paragraph or two and be submitted to the instructor.

Tutoring and Disabilities

Goshen College wants to help all students be as academically successful as possible. If you have a disability and require accommodations, please contact Lois Martin, the Director of the Academic Resource & Writing Center early in the semester. In order to receive accommodations, documentation concerning your disability must be on file with the Academic Resource & Writing Center, Good Library 112, x7576, lmartin@goshen.edu. All information will be held in the strictest confidence. The Academic Resource & Writing Center offers tutoring and writing assistance for all students. For further information please see http://www.goshen.edu/campuslife/arwc/.

Collaboration and Academic Integrity

You are encouraged to use all available resources in order to learn the concepts and techniques discussed in this course. In particular, conversations with other students and the instructor can be an effective learning method. Reading other books and web pages can be another effective learning method. However, copying someone else's work subverts the learning process.

For assignments and the project, you may look at and discuss another student's work, but any written work developed during collaboration with another student should be destroyed before writing your own solutions. You should give written acknowledgement to people with whom you have had discussions and to any written materials (other than the text) that were helpful.

Failure to observe the above rules will result in a zero on the assignment or exam. Any violation of academic integrity will be reported to the Academic Dean. Observation of the above rules will help you learn the material well and give you the satisfaction of knowing that you have earned your grade.

Due Date Policy

Class participation, assignments, and the project can only be excused, rescheduled, or made up if (1) there is a serious medical problem, a death in the immediate family, or an irreconcilable conflict with another official Goshen College activity; (2) there is written documentation signed by proper authorities; and (3) the instructor is notified prior to the due date or as soon as possible afterwards.