Please check one:  
☑ New course  ☐ Revised course

PART I: CATALOG DESCRIPTION

1. Course: ECN 3450
2. Title: Game Theory
3. Long title:
4. Class hours per week, lab hours per week, and credit [e.g., (3-0-3)]: 3-0-3
5. Term(s) to be offered: Fall  Spring  Summer  On demand
6. Initial term of offering: Fall  Spring  Summer  Year 2008

7. Course description:

The analysis of strategic choice problems. Introduces solution techniques for sequential and simultaneous games, development of pure and random strategies, and the concept of equilibrium. Applications to economic, social, political, and biological sciences including coordination and collective action problems, voting strategies and coalitions, and evolutionarily stable strategies.

8. Registration restrictions:
   a. Identify any equivalent courses: None
   b. Prerequisite: MAT 1271; may not be taken concurrently
   c. Who can waive the prerequisite(s)?
      ☐ No one  ☑ Chair  ☐ Instructor  ☐ Advisor  ☐ Other (Please specify)
   d. Co-requisites: None
   e. Repeat status:
      ☑ Course may not be repeated.
      ☐ Course may be repeated to a maximum of ___ hours or ___ times.
   f. Degree, college, major(s), level, or class to which registration in the course is restricted, if any: None
   g. Degree, college, major(s), level, or class to be excluded from the course, if any: Freshman standing

9. Special course attributes: None
10. Grading methods (check all that apply): ☑ Standard letter  ☐ C/NC  ☐ Audit  ☐ ABC/NC
11. Instructional delivery method: lecture
PART II: ASSURANCE OF STUDENT LEARNING

1. List the student learning objectives of this course:

   Students enrolled in this course will:

   1) Recognize and analyze incentives inherent in strategic situations.
   2) Use “rollback” analysis to solve sequential move problems.
   3) Develop and utilize payoff matrices to solve simultaneous move problems, both in discrete and continuous form.
   4) Learn to solve games requiring mixed strategies.
   5) Evaluate games with probabilistic outcomes.
   6) Examine a host of economic problems including, but not limited to:
      o Asymmetric information problems of signaling and screening
      o The role of credibility in long-term relationships
      o Prisoner's Dilemma problems, such as exist in advertising, the arms race, and evolutionary biology
      o Collective action problems such as the public goods problem and problems of pollution
      o Voting schemes and coalition formation
      o The bargaining process
      o Evolutionary economics
      o The competitive process and the core

2. Students will be assessed with the following tools:

   Two in-class exams and a final exam (Objectives 1, 2, 3, 4, 5, 6)
   Homework assignments (Objectives 1, 2, 3, 4, 5)
   Illustrative in-class games (Objectives 1, 6)

3. Evaluation of student performance in the course will be based on the following:

   - Two exams (25% each)
   - One final exam (25%)
   - Homework assignments, including both qualitative and quantitative components (15%)
   - Illustrative in-class games (10%)

4. This is not a technology-delivered course.

5. This course is not numbered 4750 – 4999.

6. There is no writing designation for this course.
PART III: OUTLINE OF THE COURSE

Week 1/2: Introduction to Game Theory
Week 3: Games with Sequential Moves
        Game Trees
        Solving Games by Induction
Week 4/5: Simultaneous-Move Games with Pure Strategies
        Discrete Form
        Dominance
        Nash Equilibria
Week 6: Simultaneous-Move Games with Pure Strategies
        Continuous Form Games
Week 7/8: Simultaneous-Move Games with Mixed Strategies
        Zero-Sum Games
        Best Response Analysis
        Minimax Analysis
        The Basic Algebra of Probability
Week 9: Simultaneous-Move Games with Mixed Strategies
        Non-Zero-Sum Games
        Coordination Games
Week 10: Uncertainty and Information
         Signaling
         Screening
         Separating and Pooling Equilibria
Week 11: Strategic Moves
         Credibility
         Commitments
         Deterrence and Compellence
Week 12: The Prisoner's Dilemma
         The Basic Game
         Extension to Repeated Games
Week 13: Collective Action Games
         Collective Action Problems with 2 Players
         Collective Action Problems with Large Groups
         Spillovers and Externalities
Week 14: Strategy and Voting
         Voting Paradoxes
         Strategic Manipulation of Votes
Week 15: Bargaining, Markets, and Competition

PART IV: PURPOSE AND NEED

1. Explain the department’s rationale for developing and proposing the course.

Purpose and need. Neoclassical (standard) economics generally assumes a large number of participants engaged anonymously in market transactions. However, a different and interesting set of outcomes arise when situations are characterized by a small number of agents interacting with one another. In this circumstance, the actions of one agent have strong effects on that agent's own welfare and the welfare of others. Over the past 20 years, this theory of strategic interaction, or game theory, has become prominent in
the economics discipline, and now lies at the core of modern microeconomic theory. Adoption of this course brings the Economics curriculum up to date and provides a critical service to our majors.

a. This is not a general education course.
b. This is not a technology-delivered course.

2. Justify the level of the course and any course prerequisites, co-requisites, or registration restrictions.

The new course is appropriate for sophomores, juniors, and seniors and the 3000- designation qualifies it for undergraduate elective credit. The course content requires no prior knowledge of economics, and students from other fields may find the material useful. A college algebra prerequisite has been requested, however, as the material is quantitatively oriented.

3. If the course is similar to an existing course or courses, justify its development and offering.

a. If the contents substantially duplicate those of an existing course, the new proposal should be discussed with the appropriate chairpersons, deans, or curriculum committees and their responses noted in the proposal.

This course is not similar to any existing course.

b. Cite course(s) to be deleted if the new course is approved. If no deletions are planned, note the exceptional need to be met or the curricular gap to be filled.

No deletions are planned. This course fills a curricular gap, as pointed out in the most recent 10-year external review.

4. Impact on Program(s):

a. This course will be an approved elective for Economics majors and minors.

b. This is not a graduate course.

PART V: IMPLEMENTATION

1. Faculty member(s) to whom the course may be assigned:

Drs. Alan Grant, Linda Ghent, James Bruehler, Tim Mason, or any other qualified faculty.

2. Additional costs to students:

There will be no additional costs to students.

3. Text and supplementary materials to be used (Include publication dates):
PART VI: COMMUNITY COLLEGE TRANSFER

If the proposed course is a 1000- or 2000-level course, state either, "A community college course may be judged equivalent to this course" OR "A community college course will not be judged equivalent to this course." A community college course will not be judged equivalent to a 3000- or 4000-level course but may be accepted as a substitute; however, upper-division credit will not be awarded.

Not applicable.

PART VII: APPROVALS

Date approved by the Economics Department: October 16, 2006

Date approved by the College of Sciences Curriculum Committee: December 1, 2006

Date approved by CAA: January 11, 2007