All Syracuse University policies and procedures concerning academic honesty apply to this course:

"Syracuse University students shall exhibit honesty in all academic endeavors. Cheating in any form is not tolerated, nor is assisting another person to cheat. The submission of any work by a student is taken as a guarantee that the thoughts and expressions in it are the student's own except when properly credited to another. Violations of this principle include: giving or receiving aid in an exam or where otherwise prohibited, fraud, plagiarism, the falsification or forgery of any record, or any other deceptive act in connection with academic work. Plagiarism is the representation of another's words, ideas, programs, formulae, opinions, or other products of work as one's own either overtly or by failing to attribute them to their true source." (Section 1.0, University Rules and Regulations)

WARNING!!!

While homework problems may have been done cooperatively, exams are individual work. Do not communicate about this exam with anyone except the instructor [x3-2345 or e-mail to jskelly@maxwell.syr.edu]. Violation of this rule will result in a grade of 0 for the exam. Any notices will be sent to you by e-mail; check occasionally.

EXPLAIN your answers carefully.

*Keep a Xerox copy of your exam*

DUE: 9:30 am, Tuesday, April 2, at the start of class.

You must bring your completed exam to class (I urge you to make a copy). Under no circumstances are you to give your exam to someone else to turn in for you. Doing so will result in a grade of 0 for the exam.
Second Exam

EXPLAIN your answers carefully. DUE: 9:30 am, Tuesday, April 2, at the beginning of class. The four problems are each worth 25 points. In each problem, you may want to draw diagrams. BE SURE your diagrams make sense, e.g., that relative slopes make sense.

1. (Weak perfect Bayesian equilibrium) On the last page there is displayed a game in extensive form. Determine all weak perfect Bayesian equilibria of this game.

2. (Signaling) Modify the text analysis of education as a signal for the case where we make two changes at the same time:

(1) Individuals get some positive utility from education:

\[ U(w,e) = e + w - c(e, \theta) \]

using the cost function

\[ c(e, \theta) = e^2/\theta. \]

(2) education level affects productivity: A type \( \theta \) worker produces \( \theta + \mu e \) units of output when her education level is \( e \).

Assume high productivity workers have \( \theta = 2 \) and \( r = 0 \) while low productivity workers have \( \theta = 1 \) and \( r = 0 \). What are the minimum and the maximum amount of education a high productivity worker might choose at a separating equilibrium?

3. (Signaling) Suppose there are four productivity types, low, medium, high and very high with equal numbers of workers in each type and

\[ 0 < \theta_L < \theta_M < \theta_H < \theta_{VH} \]
All reservation wages are 0. Assume e doesn’t affect productivity and that utility of Type-i is given by

\[ U_i = w - C(e_i, \theta_i) \]

where the cost function has all the usual properties; e.g., resulting indifference curves have their usual shape and are single-crossing.

A. Can you find values of the \( \theta \)s and proportions of each type in the population such that there exists an equilibrium where the L-types and M-types are pooled together at one level of education while the H-types and VH-types are pooled together at a different level of education?

B. Can you find values of the \( \theta \)s and proportions of each type in the population such that there exists an equilibrium where the L-types and H-types are pooled together at one level of education while the M-types and VH-types are pooled together at a different level of education?

C. Can you find values of the \( \theta \)s and proportions of each type in the population such that there exists an equilibrium where the L-types and VH-types are pooled together at one level of education while the M-types and H-types are pooled together at a different level of education?

4. (Screening) There are three worker types: H, M, and L, with parameters \( \theta_1 = 1 \), \( \theta_2 = 3 \) and \( \theta_3 = 5 \). For task level \( t \),

\[ U_i = w - C(t, \theta_i) = w - \frac{t^2}{\theta_i} \]

Productivity depends on task level: \( P_i = \theta_i + \lfloor t \rfloor \). Determine any subgame perfect Nash equilibria. Here \( \lfloor t \rfloor \) is the floor function, giving the largest integer \( \leq t \).