Math 339: Evolutionary Game Theory
Winter, 2012

Instructor: Wes Maciejewski
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Course Times: M 1:30-2:30, W 12:30-1:30, F 11:30-12:30
Course Location: Kingston Hall, 201
Office Hours: M-F 9:00-12:00, unless otherwise noted. I’m also willing to meet at another
time if you send an e-mail asking to.

Course Text: None! We will primarily use lecture notes supplemented by ad-hoc resources.

Course Description:
Since its foundation, post-World War Two, game theory has become an immense field of
study. Every field that deals with interacting agents (psychology, political science, economics,
biology, . . .) draws on tools from game theory. The primary focus of this course will be the
application of game theory to biology-inspired problems.

There is so much that this course could cover. I have a list of topics that I think are
necessary:

1. Introduction to games
2. Game equilibria
3. The mathematical analysis of equilibria
4. Population dynamics
5. Evolutionary games

The remainder of the course will be filled with topics that we find interesting. Notice
that the topics I’ve listed are not arranged on a timeline. We’ll take as much time as needed;
some topics may be interesting to you and we’ll dwell on them.

Evaluation:
Assignments 50%
Final 50%

Assignments:
I’ve constructed an assessment scheme that will minimize the amount of work required
of you outside of the lecture while maximizing your learning. Studies have shown that
evaluating a colleague’s work promotes a deepening of one’s own understanding. To this
end, our course will employ this peer assessment with a bit of a twist.

The class will be divided into groups of five. The groups will compete for the overall top
accumulated score. The groups with the top score will receive the final assignment grade
(roughly 5%) for free.

Points are assigned to the top three (sets of) groups after each assignment, ranked by
group average. The top group will receive 3 points; second place, 2 points; and 1 for third.
Assignments will consist of five questions, one for each student. In the case of a group of less than five students, each student need only complete one question. The questions are then graded by the other members of the group. Each individual receives the average of the (at most) four grades on their work. Grades are submitted anonymously via the course website. Not submitting scores translates into a zero for your own work. Once the grades have been submitted, the assignment questions completed by each group will be handed in.

To prevent unjust grades (either too high or too low) the TA will evaluate a selection of the assignments. The TA will select an undisclosed number of group assignments and grade them. If there is a discrepancy, outside of some allowed error, between the TA’s grade and the grade assigned by an individual that individual’s own grade will be halved. That is, individuals will be penalized for assigning unreasonably high or low grades grades. Regardless if the grade is within or outside of the buffer, the TA’s grade will always prevail. Of course, fairness is key. Any student that feels evaluated unfairly will be able to communicate their concerns to the TA.

A grading rubric will be provided to all the students and the TA. This will provide a framework for the grading. Students will also write comments on each group member’s work justifying the assigned grade. This will be kept by the grading student and can be used in discussions with the TA.

Course Grades:

All work in the class will be assigned a numeric grade that, at the end of the term, will be translated into a letter grade via:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
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<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
</tr>
<tr>
<td>A</td>
<td>85-89</td>
</tr>
<tr>
<td>A-</td>
<td>80-84</td>
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<tr>
<td>B+</td>
<td>77-79</td>
</tr>
<tr>
<td>B</td>
<td>73-76</td>
</tr>
<tr>
<td>B-</td>
<td>70-72</td>
</tr>
<tr>
<td>C+</td>
<td>67-69</td>
</tr>
<tr>
<td>C</td>
<td>63-66</td>
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<tr>
<td>C-</td>
<td>60-62</td>
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<td>D+</td>
<td>57-59</td>
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<tr>
<td>D</td>
<td>53-56</td>
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<tr>
<td>D-</td>
<td>50-52</td>
</tr>
<tr>
<td>F</td>
<td>49 and below</td>
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</tbody>
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Academic Integrity:

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see [www.academicintegrity.org](http://www.academicintegrity.org)). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas” essential to the intellectual life of the University (see the Senate Report on Principles and Priorities [http://www.queensu.ca/secretariat/senate/policies/principri/](http://www.queensu.ca/secretariat/senate/policies/principri/))
Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 http://www.queensu.ca/artsci/academic-calendars/2011-2012-calendar/academic-regulations/regulation-1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen’s. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.