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<td>11/15/2013</td>
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<td>SOC</td>
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<td>11/15/2013</td>
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<td>000-102</td>
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<td>11/15/2013</td>
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<td>WGS</td>
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<td>Mental Illness, Gender, and Psychiatry</td>
<td>A</td>
<td>11/15/2013</td>
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</table>
# Course and Curriculum
## Course Addition Form

### Course as you wish it to appear in the Bulletin:

<table>
<thead>
<tr>
<th>School/College:</th>
<th>AS-College of Arts And Sciences</th>
<th>Dept/Course #:</th>
<th>POL 517</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective Date:</td>
<td>1/1/2014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The date that the course will be active in the system e.g. (the starting date that you will be able to add course sections)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Full Title: Introductory Statistical Methods in Political Science

### Abbreviated Title: Intro Stats in Pol Sci

### # of Credits: 3

### Frequency: 01 - Fall

### Is taken for Credit Only: Y

### Full Time Indicator*: Y

### Alt Title: Y

### Prerequisites: POL 201, 202, or 203

### Identifiers: Identifier 1

### Non-Credit: Y

### Gen. Ed. Req.: Y

### Is this an experimental course: Y

### Attach course description when submitting form to your curriculum committee or dean; when approved please email full course description to scheduling.rg@miami.edu

### Dept Contact: Casey Klostad

### Email address: klostad@gmail.com

### Phone: 8-8861

### Department Chair Signature: Jonathan P. West

### Date: 06/18

### Academic Dean/Director Signature: ____________________________

### Date: ______

### Dean of the Graduate School: ____________________________

### Date: ______

### Curriculum Committee Chair: ____________________________

### Date: ______

*Justification of full time status must also be submitted (see supplemental information course addition form).
POL 517: Introductory Statistical Methods in Political Science
Proposed course for Department of Political Science

Course description for Bulletin:

Introduces the tools needed to manipulate and analyze quantitative data rigorously so you may answer questions of political interest. First in a two-course sequence (followed by POL 518).
Introductory Statistical Methods in Political Science
POL 595A

Thursdays
6:25pm–9:05pm
Room MM-105

Instructor Information
Santiago Olivella, Ph.D.
Assistant Professor of Political Science
Office: Jenkins 314-L
e-Mail: olivella@miami.edu
Telephone: (305) 284-8052
Office Hours: Wed. 2:00pm–4:00pm and by appointment

Course Description
This class is designed to introduce you to the tools needed to manipulate and analyze quantitative data rigorously, so that you may successfully take advantage of an information-rich environment to answer questions of political interest. Although the materials of the course are based on mathematical models of phenomena, and although basic mathematical (and more specifically probabilistic) thinking will be involved in our discussions, this introductory course will focus primarily on understanding the core concepts of descriptive and inferential statistics. Specifically, the class will focus on how to apply simple statistical tools to substantive problems and on how to communicate the results of such applications to others. In order to prepare you for studying more sophisticated statistical techniques in the future, we will spend a substantial amount of time covering the basics of probability theory. We will also study descriptive measures of central tendency and dispersion, hypothesis testing, contingency tables and linear regression.

Learning Objectives
By the end of this course, you should be able to:

- Present data using graphics and descriptive statistics in a clear and informative manner.
- Apply concepts from probability theory to social science research questions.
- Make inferences about the distribution of populations based on a sample.
- Correctly conduct and interpret hypothesis tests.
• Understand linear regression in theory and practice (i.e., be able to read and interpret regression tables in academic articles).

• Do all of the above using basic and advanced features of MS Excel 2010.

• Describe the threats to making causal inferences from observational data and identify how they could change the conclusions of a study.

Course Prerequisites
There are no prerequisites for this course.

Class Structure
Our sessions will be divided into traditional lectures, a short coffee-break, and software training. In order to encourage learning from your peers, you will work in pairs during the software training portions of the class. You are welcome to each bring your own laptop computer, but only one computer per pair should be used during training.

Textbooks


Software
Although more powerful software suites exist (and are more widely used by researchers), a recent study shows how important MS Excel is for the policy industry. As a result, the software training portion of this class will teach you how to implement all the statistical tools we learn in MS Excel. As part of the University's Microsoft Campus Agreement Student Option, you are allowed to use one copy of Microsoft Office (including MS Excel) free of charge until graduation. You may download the Office Suite here (for Mac users) or here (for Windows users).\(^1\) Because these licenses do not support the 2013 version of the Office Suite, the course will focus on implementation on the 2010 version.

Requirements and Evaluation
Grading in this class will be based on the components described below. Failure to meet the requirements of the course will result in a failing grade.

\(^1\) Linux users are welcome to use the LibreOffice suite and ask me for advise on how the different functions we study are implemented in it.
Problem Sets and Quizzes – 20%

Problem sets (PS), or homeworks, will be distributed throughout the course, and include exam reviews. These are individual assignments that you should prepare yourself, though you may ask your colleagues for help. Please turn them in on the specified date at the beginning of class with only your CanID number (i.e., not your name) written in the space provided. If you have a printing problem, you are responsible for emailing it to me before class starts. Each student’s lowest homework grade will be dropped in the final grade calculations. This option should be reserved for illness, family emergencies, broken alarm clocks, or other unforeseen events. No additional waivers will be granted.

Individual preparedness assessments, or short quizzes, will be administered throughout the semester. These are designed to ensure that students arrive to class prepared to engage in discussion. You should complete IPAs yourself with no assistance from your colleagues. Each student’s two lowest IPA grades will be dropped in the final grade calculations. This option should be reserved for illness, family emergencies, broken alarm clocks, or other unforeseen events. No additional waivers will be granted.

Pre-Lecture Questions – 10%

To ensure that all students get the most of each session, and to facilitate active discussion should it arise, each student must submit three questions prompted by the study of the reading materials assigned for each session. The questions should be emailed to me by 8pm on the day prior to each session. No late submissions will be accepted. I will address these questions explicitly when they are not covered by the lecture material.

Midterm Exams – 40% (20% each)

There will be two exams during the semester. They will be held in class on Date TBA and date TBA (both exams contain an at-home portion to be returned the following week), and will cover the material discussed in class up to that point. Students will be provided with relevant materials and are allowed to use a reference sheet and a calculator with no information stored in memory, as discussed in the ‘Academic Honesty’ section below.

Final Exam – 30%

A comprehensive final exam will be held on Date TBA at Time TBA (location TBA). Students will be provided with relevant statistical tables and are allowed to use a reference sheet and a calculator with no information stored in memory, as discussed in the ‘Academic Honesty’ section below.
Grading Scale (in percentages)

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
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<th>Grade</th>
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<tbody>
<tr>
<td>≥ 94</td>
<td>A</td>
<td>≥ 83</td>
<td>B</td>
<td>≥ 73</td>
<td>C</td>
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<td>≥ 90</td>
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<tr>
<td>≥ 87</td>
<td>B+</td>
<td>≥ 77</td>
<td>C+</td>
<td>≥ 67</td>
<td>D+</td>
<td>&lt; 60</td>
<td>Fail</td>
</tr>
</tbody>
</table>

Class Policies

Late work and Incompletes

Late work will not be accepted without prior permission. Makeup exams will not be given, and students who miss exams will receive a score of 0, absent extraordinary circumstances. No incompletes will be given for assignments, exams, or the course. Exceptions will be granted only under truly extraordinary circumstances. If a student needs to miss an examination or requires special accommodations, prior arrangements should be made with me at least two weeks in advance.

Grade Appeals

I am happy to meet with students about grading issues. If you wish to appeal the grading of an exam or assignment, you must return it to my mailbox (in the Political Science main office) by Noon on the following Monday, and you must inform me that you have done so over e-mail. You must staple to the original graded exam or assignment a typed note that states which question(s) is (are) to be re-graded and why you believe that your answer deserves more credit. Nothing additional (notes, explanations, etc.) should be written on the original assignment and no changes or erasures should be made on the original before regrading. A percentage of all written assignment are photocopied and compared to the regrade requests. Cheating will not be tolerated.

Attendance

You will not be graded directly on your attendance. Poor attendance will be reflected in your in-class assignment (including quizzes) grades. However, I strongly suggest students expecting to receive an A in this course attend all lectures.

Technology in the classroom

You will frequently make use of computers in this course, during some lecture periods and during software training. Please be respectful to your instructor and your peers by using your computers only for class-related purposes. Put your phone away before class starts and don’t bring it out.
Students with disabilities

Students with disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an appointment to see me before the end of the second week of the semester. All conversations will remain confidential. Please also arrange to have the required documentation sent to me for any accommodations at least two weeks prior to the first exam.

Religious observances

Some students may wish to take part in religious observances that occur during this semester. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the semester to discuss appropriate accommodations.

Academic honesty

Cheating and plagiarism will not be tolerated. I strongly encourage you to review the University's policies regarding academic honesty, which you can read here (for graduate students) or here (for undergraduate students). In general, if you have any question, please feel free to ask me. Specific rules for this course:

• You may work together on homework in small groups, but you should each prepare and turn in your answers separately.

• The homeworks and in-class work are “open book” and “open notes.” However, you may not make use of answer keys or graded assignments provided by students from previous years for either homework or in-class assignments.

• Your are to consult only with me during exams (including take-home portions).

• You will be allowed to bring one hand-written reference sheet of paper to exams. This may be filled (front and back) with any equations or notes you may find helpful. Otherwise the exams will be “closed book.”

• Graphing calculators are allowed during exams, but the memory must be cleared. Students should be prepared to show a confirmation of a cleared memory at the beginning of the exam. Cellphones may not be used as calculators.

All cases of cheating or plagiarism will be referred to the University of Miami's (Undergraduate) Honor Council. If the Council finds a student guilty of cheating, then he/she will automatically fail the course, in addition to incurring any penalties determined by the Council.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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<tr>
<td>29-Aug</td>
<td>Introduction&lt;br&gt;Class Overview&lt;br&gt;Data Types&lt;br&gt;Excel: Quick Overview of Excel&lt;br&gt;Excel: Poweruser tricks</td>
<td>DK: xxxvi-64</td>
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<td>5-Sep</td>
<td>Data Description&lt;br&gt;Data Visualization&lt;br&gt;Excel: Data Visualization in Excel</td>
<td>DK: Chapters 3 &amp; 4</td>
<td>PS1 out.</td>
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<td>Probability I: Sets and probability&lt;br&gt;Excel: Monte Carlo Simulations</td>
<td>G: Chapters 1 &amp; 2</td>
<td>PS1 due; PS2 out.</td>
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<td>Probability II: Random Variables&lt;br&gt;Excel: Describing samples in Excel</td>
<td>G: Chapter 4</td>
<td>PS2 due; PS3 out.</td>
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<td>Probability II: Bestiary of Distributions&lt;br&gt;Simple probability calculations&lt;br&gt;Excel: Probability-related functions in Excel</td>
<td>DK: Chapter 7, G: Chapter 5, SO: Short Bestiary</td>
<td>PS3 due; Midterm Review out.</td>
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<td>Midterm Exam I</td>
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<td>Midterm at-home out.</td>
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<td>Hypothesis tests</td>
<td>DK: Chapters 8 &amp; 10</td>
<td>Midterm at-home due; PS4 out.</td>
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<td>17-Oct</td>
<td>Fall Recess</td>
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<td>Confidence Intervals</td>
<td>DK: Chapter 9</td>
<td>PS4 due; PS5 out.</td>
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<td>31-Oct</td>
<td>Contingency Tables&lt;br&gt;Excel: Pivot Tables and $\chi^2$ Tests</td>
<td>DK: Chapter 12</td>
<td>PS5 due; Midterm Review out.</td>
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<td>Midterm Exam II&lt;br&gt;Bivariate Regression</td>
<td>DK: Chapter 5, 435-453</td>
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<td>Inference with regression&lt;br&gt;Model Fit&lt;br&gt;Excel: Regression in Excel</td>
<td>DK. 434-475</td>
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<td>21-Nov</td>
<td>Multivariate Regression&lt;br&gt;Interactions&lt;br&gt;Excel: Multivariate regression in Excel</td>
<td>DK: Chapter 14, Brambor et al. 2006</td>
<td>PS6 due; PS7 out.</td>
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<td>28-Nov</td>
<td>Thanksgiving Recess</td>
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<td>5-Dec</td>
<td>Causality</td>
<td>DK: Chapter 6</td>
<td>PS7 due; Final Review out.</td>
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<td>17-Dec</td>
<td>Final Exam</td>
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Course and Curriculum
Course Addition Form

School/College: AS-College of Arts And Sciences
Dept/Course #: POL 518

Effective Date: 9/9/2013
The date that the course will be active in the system e.g. (the starting date that you will be able to add course sections)

Full Title: Advanced Statistical Methods in Political Science
150 Character Limit
Abbreviated Title: Advanced Stats in Pol Sci
18 Character Limit

# of Credits: 3
Frequency: 11 - Spring

Is taken for Credit Only: ☑ N ☐ Y
Indicates whether the course is flagged as credit only
course. If flagged 'Y', student receives CR or NC instead of a letter grade.

Full Time Indicator*: ☑ N ☐ Y
Indicates whether the course is flagged as full-time
credit status. If flagged 'Y', students who register
for the course section will be considered full-time
student during the specific term.

Alt Title: ☑ N ☐ Y
The Alternate Title replaces the actual
title on the student's transcript.

Prerequisites: POL 517 (Introductory Statistical Methods in Political Science)

Identifiers:
(WRITE, HONOR, INTR, INTR2, INTR3, INTR4, etc.)

Non-Credit: ☑ N ☐ Y
Gen. Ed. Req.: ☑ N ☐ Y
Is this an experimental course: ☑ N ☐ Y

Attach course description when submitting form to your curriculum committee or dean; when approved please email full course description to scheduling.rg@miami.edu
Use the course number as the subject line of the email.
1422 Character Limit.

Dept Contact: Casey Klostad
Phone: 8-8861
Email address: klostad@gmail.com

Department Chair Signature: [Signature]
Date: 9/9/13

Academic Dean/Director Signature: __________________________
Date: ____________

Dean of the Graduate School: __________________________
required for graduate courses only
Date: ____________

Curriculum Committee Chair: __________________________
Date: ____________

*Justification of full time status must also be submitted (see supplemental information course addition form).
POL 518: Advanced Statistical Methods in Political Science
Proposed course for Department of Political Science

Course description for Bulletin:

Introduces the maximum likelihood framework for statistical inference in the study of politics. Second in a two-course sequence (preceded by POL 517).
Advanced Statistical Methods in Political Science
POL Code TBA

Scheduled Day
Scheduled Time
Room TBA

Instructor Information
Santiago Olivella, Ph.D.
Assistant Professor of Political Science
Office: Jenkins 314-L
e-Mail: olivella@miami.edu
Telephone: (305) 284-8052
Office Hours: Wed. 2:00pm–4:00pm and by appointment

Course Description
This class is designed to introduce you to the maximum likelihood framework for statistical inference. It is an advanced statistics course, and it is meant to build on the skills and knowledge developed in an introductory statistics course such as POL 595A. Although it will spare you certain details about estimation procedures, it relies heavily on a solid understanding of basic probability and calculus concepts. In addition to presenting the linear model in the light of the likelihood framework, it also covers models for discrete data – including binary, multinomial, ordered and count outcomes. In addition, the course will serve as an introduction to the R programming environment, a powerful and versatile open-source statistics suite. The course is therefore ideal for those who wish to become thorough consumers – and apt producers – of professional empirical research.

Learning Objectives
By the end of this course, you should be able to:

• Understand the basics of maximum likelihood estimation (MLE) techniques.

• Identify widely used probability distributions, and understand the contexts in which they should be used.

• Understand the basic optimization problems involved in parameter estimation and statistical inference.

• Understand the linear model in the context of MLE.

• Estimate and assess parametric models for binary, multinomial, ordered and count outcome variables, and interpret results of these estimations.
• Use R to manage data, analyze it, and create summary graphs of these analyses.

• Use R to write and optimize your own likelihood functions.

Course Prerequisites
Completion of POL 355A is required for this course. Basic training in differential calculus and matrix algebra is ideal, but not required.

Graduate/Undergraduate Student Policy
This is a 500-level course, and it will be composed of both graduate and undergraduate students. However, there will be no difference between the two types of students in the materials covered or evaluated.

Class Structure
Our sessions will be divided into traditional lectures, a short coffee-break, and software training. In order to encourage learning from your peers, you will work in pairs during the software training portions of the class. You are welcome to each bring your own laptop computer, but only one computer per pair should be used during training.

Textbooks
The course has two textbooks available in the campus bookstore.


All other assigned readings will be made available electronically via Blackboard for the duration of the course.

Software
Although MSExcel is very widely used (and expertise in it is usually sought after by the non-specialized industry), the R programming environment (available for download at [http://cran.rstudio.com/](http://cran.rstudio.com/)) is the lingua franca of applied statisticians. Its main appeal is its open-source nature, which allows anyone to expand it and modify it however they want, and you to use it for free. It is also cross-platform, making it highly portable. For all these reasons, we will learn how to apply all the concepts learned in the class in R. In addition to the R base, we will be using a user interface called RStudio (available for download at [http://www.rstudio.com/ide/download/](http://www.rstudio.com/ide/download/)).
Requirements and Evaluation

Grading in this class will be based on the components described below. Failure to meet the requirements of the course will result in a failing grade.

Problem Sets and Quizzes – 20%

Eight problem sets (PS), or homeworks, will be distributed throughout the course, and they include two exam reviews. These are individual assignments that you should prepare yourself, though you may ask your colleagues for help. Please turn them in on the specified date at the beginning of class with only your CaneID number (i.e., not your name) written in the space provided. If you have a printing problem, you are responsible for emailing it to me before class starts. Each student’s lowest homework grade will be dropped in the final grade calculations. This option should be reserved for illness, family emergencies, broken alarm clocks, or other unforeseen events. No additional waivers will be granted.

Individual preparedness assessments, or short quizzes, will be administered throughout the semester. These are designed to ensure that students arrive to class prepared to engage in discussion. You should complete IPAs yourself with no assistance from your colleagues. Each student's two lowest IPA grades will be dropped in the final grade calculations. This option should be reserved for illness, family emergencies, broken alarm clocks, or other unforeseen events. No additional waivers will be granted.

Pre-Lecture Questions – 10%

To ensure that all students get the most of each session, and to facilitate active discussion should it arise, each student must submit three questions prompted by the study of the reading materials assigned for each session. The questions should be emailed to me by 8pm on the day prior to each session. No late submissions will be accepted. I will address these questions explicitly when they are not covered by the lecture material.

Midterm Exams – 40% (20% each)

There will be two exams during the semester. They will be held in class on Date TBA and date TBA (both exams contain an at-home portion to be returned the following week), and will cover the material discussed in class up to that point. Students will be provided with relevant materials and are allowed to use a reference sheet and a calculator with no information stored in memory, as discussed in the ‘Academic Honesty’ section below.

Final Exam – 30%

A comprehensive final exam will be held on Date TBA at Time TBA (location TBA). Students will be provided with relevant statistical tables and are allowed to use a reference

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1The final exam review distributed during the final week of classes is meant only as a study guide and will not be graded.
sheet and a calculator with no information stored in memory, as discussed in the ‘Academic Honesty’ section below.

Grading Scale (in percentages)

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>≥ 94</td>
<td>A</td>
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<td>B</td>
<td>≥ 73</td>
<td>C</td>
<td>≥ 63</td>
<td>D</td>
</tr>
<tr>
<td>≥ 90</td>
<td>A-</td>
<td>≥ 80</td>
<td>B-</td>
<td>≥ 70</td>
<td>C-</td>
<td>≥ 60</td>
<td>D-</td>
</tr>
<tr>
<td>≥ 87</td>
<td>B+</td>
<td>≥ 77</td>
<td>C+</td>
<td>≥ 67</td>
<td>D+</td>
<td>&lt; 60</td>
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Class Policies

Late work and incompletes

Late work will not be accepted without prior permission. Makeup exams will not be given, and students who miss exams will receive a score of 0, absent extraordinary circumstances. Nc incompletes will be given for assignments, exams, or the course. Exceptions will be granted only under truly extraordinary circumstances. If a student needs to miss an examination or requires special accommodations, prior arrangements should be made with me at least two weeks in advance.

Grade Appeals

I am happy to meet with students about grading issues. If you wish to appeal the grading of an exam or assignment, you must return it to my mailbox (in the Political Science main office) by Noon on the following Monday, and you must inform me that you have done so over e-mail. You must staple to the original graded exam or assignment a typed note that states which question(s) is (are) to be re-graded and why you believe that your answer deserves more credit. Nothing additional (notes, explanations, etc.) should be written on the original assignment and no changes or erasures should be made on the original before regrading. A percentage of all written assignment are photocopied and compared to the regrade requests. Cheating will not be tolerated.

Attendance

You will not be graded directly on your attendance. Poor attendance will be reflected in your in-class assignment (including quizzes) grades. However, I strongly suggest students expecting to receive an A in this course attend all lectures.

Technology in the classroom

You will frequently make use of computers in this course, during some lecture periods and during software training. Please be respectful to your instructor and your peers by
using your computers only for class-related purposes. Put your phone away before class starts and don’t bring it out.

Students with disabilities

Students with disabilities enrolled in this course who may need disability-related classroom accommodations are encouraged to make an appointment to see me before the end of the second week of the semester. All conversations will remain confidential. Please also arrange to have the required documentation sent to me for any accommodations at least two weeks prior to the rst exam.

Religious observances

Some students may wish to take part in religious observances that occur during this semester. If you have a religious observance that conflicts with your participation in the course, please meet with me before the end of the second week of the semester to discuss appropriate accommodations.

Academic honesty

Cheating and plagiarism will not be tolerated. I strongly encourage you to review the University’s policies regarding academic honesty, which you can read here (for graduate students) or here (for undergraduate students). In general, if you have any question, please feel free to ask me. Specific rules for this course:

- You may work together on homework in small groups, but you should each prepare and turn in your answers separately.

- The homeworks and in-class work are “open book” and “open notes.” However, you may not make use of answer keys or graded assignments provided by students from previous years for either homework or in-class assignments.

- Your are to consult only with me during exams (including take-home portions).

- You will be allowed to bring one hand-written reference sheet of paper to exams. This may be filled (front and back) with any equations or notes you may find helpful. Otherwise the exams will be “closed book.”

- Graphing calculators are allowed during exams, but the memory must be cleared. Students should be prepared to show a confirmation of a cleared memory at the beginning of the exam. Cellphones may not be used as calculators.

All cases of cheating or plagiarism will be referred to the University of Miami’s (Undergraduate) Honor Council. If the Council finds a student guilty of cheating, then he/she will automatically fail the course, in addition to incurring any penalties determined by the Council.
### Calendar with Topics, Required Readings and Assignments.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>• Introduction: Probability as a model for inference.</td>
<td>• Syllabus</td>
<td>• PS1 out.</td>
</tr>
<tr>
<td></td>
<td>• Software: General calculations in R</td>
<td>• (P) Chapter 1: Getting Started with R.</td>
<td></td>
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<tr>
<td>Week 2</td>
<td></td>
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<tr>
<td></td>
<td>• Math Refresher II</td>
<td>• PSI due.</td>
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<tr>
<td></td>
<td>• Software: Probability functions in R</td>
<td>• Midterm Review out.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Midterm Review Due</td>
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<tr>
<td></td>
<td></td>
<td>• PS 2 out.</td>
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<tr>
<td></td>
<td>• Exam 1</td>
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<tr>
<td></td>
<td></td>
<td>• (P) Chapter 2: Reading and Manipulating Data (except 2.5 and 2.6); Chapter 3: Exploring and Transforming Data (except 3.3, 3.4 and 3.5)</td>
<td></td>
</tr>
<tr>
<td>Week 6</td>
<td>• The linear model redux</td>
<td>• (L) Chapter 2: Continuous Outcomes The Linear Regression Model</td>
<td>• PS 2 due.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• (P) Chapter 4: Fitting Linear Models (only 4.1, 4.2, 4.3.1−4.3.4,4.1,4.8)</td>
<td></td>
</tr>
<tr>
<td>Week 7</td>
<td>• Exam 2</td>
<td></td>
<td>• Midterm Review due.</td>
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<td>• Midterm at-home out.</td>
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<tr>
<td></td>
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<td></td>
<td>• Midterm at-home due.</td>
</tr>
<tr>
<td>Week 8</td>
<td>• Models for binary outcomes I</td>
<td>• (L) Chapter 3: Binary Outcomes: The linear Probability, Probit, and Logit Models</td>
<td>• PS 3 out.</td>
</tr>
<tr>
<td></td>
<td>• Software: Models for binary data in R</td>
<td>• (P) Chapter 5: Fitting Generalized Linear Models (only 5.1−5.4)</td>
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</tr>
</tbody>
</table>

*Continued on next page*
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
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</thead>
<tbody>
<tr>
<td>Week 9</td>
<td>• Models for binary outcomes II</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Software: Writing and optimizing your own likelihood function in R</td>
<td></td>
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<tr>
<td></td>
<td>• The multinomial model</td>
<td>(L) Chapter 4: Hypothesis Testing and Goodness of Fit</td>
<td>• PS 3 due.</td>
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<tr>
<td></td>
<td></td>
<td>(F) Chapter 8: Writing programs (only 8.1, 8.3, and 8.5)</td>
<td>• PS 4 out.</td>
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<tr>
<td>Week 10</td>
<td>• Models for multinomial model</td>
<td>(L) Chapter 6: Nominal Outcomes: Multinomial Logit and Related Models</td>
<td>• PS 4 due.</td>
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<td>• Software: Multinomial models in R</td>
<td>(F) Section 5.7: Multinomial Response Data</td>
<td>• PS 5 out.</td>
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<tr>
<td>Week 11</td>
<td>• Models for ordered data</td>
<td>(L) Chapter 5: Ordered Logit and Procrasted Probit Analysis</td>
<td>• PS 5 due.</td>
</tr>
<tr>
<td></td>
<td>• Software: Ordered Probit in R</td>
<td>(F) Section 5.9: Proportional Odds Model</td>
<td>• PS 6 out.</td>
</tr>
<tr>
<td>Week 12</td>
<td>• Models for count data</td>
<td>(L) Chapter 8: Count Outcomes: Regression Models for Counts</td>
<td>• Final Review out.</td>
</tr>
<tr>
<td></td>
<td>• Software: Poisson and Negative Binomial models in R</td>
<td>(F) Section 5.5: Poisson GLMs for Count Data</td>
<td></td>
</tr>
</tbody>
</table>
Course and Curriculum
Course Addition Form

Course as you wish it to appear in the Bulletin:

School/College: AS-College of Arts And Sciences
Dept/Course #: POL 517

Effective Date: 1/1/2014
The date that the course will be active in the system e.g. (the starting date that you will be able to add course sections)

Full Title: Introduction to Game Theory
150 Character Limit
Abbreviated Title: Intro. Game Theory
18 Character Limit

# of Credits: 3
Frequency: 11 - Spring

Is taken for Credit Only: ☑ N ☐ Y
Full Time Indicator*: ☑ N ☐ Y
Alt Title: ☑ N ☐ Y
Indicates whether the course is flagged as credit only course. If flagged "Y", student receives CR or NC instead of a letter grade.
Indicates whether the course is flagged as full-time credit status. If flagged "Y", students who register for the course section will be considered full-time student during the specific term.
The Alternate Title replaces the actual title on the student's transcript.

Prerequisites: POL 201, POL 202, or POL 203

Identifiers:
(WRITE, HONOR, INTR1, INTR2, INTR3, INTR4, etc.)

Non-Credit: ☑ N ☐ Y
Gen. Ed. Req.: ☑ N ☐ Y
Is this an experimental course: ☑ N ☐ Y

Attach course description when submitting form to your curriculum committee or dean;
when approved please email full course description to scheduling.reg@Miami.edu
(Use the course number as the subject line of the email.
1422 Character Limit)

Dept Contact: Email address: Phone:

Department Chair Signature: Date: 11/1/11
Academic Dean/Director Signature: Date:
Dean of the Graduate School: Date:
Curriculum Committee Chair:

*Justification of full time status must also be submitted (see supplemental information course addition form).
# Course and Curriculum

## Course Addition Form

**Course as you wish it to appear in the Bulletin:**

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<thead>
<tr>
<th>School/College:</th>
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<tbody>
<tr>
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<td>POL 519</td>
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<td>Effective Date:</td>
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<tr>
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</table>

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Attach course description when submitting form to your curriculum committee or dean; when approved please email full course description to scheduling_rg@miami.edu

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Dept Contact: | Email address: | Phone:
POL 519: Introduction to Game Theory
Proposed course for Department of Political Science

Course description for Bulletin:

Provides upper level undergraduate students and graduate students with a firm grasp on the rudiments of non-cooperative game theory. Mainly intended for political science students, but presents applications from other academic disciplines such as economics, business administration, sociology, and psychology.

NOTE: This course is currently offered as a special topics course (POL 595).
INRODUCTION TO
GAME THEORY
POL 595 (5K), SPRING 2013
WEDNESDAY, 6:25 – 9:05 (MM 104)

Arthur M. Simon, J.D., Ph.D.

Office: 314N Jenkins Building
Hours: TUE-WED-THR, 2:30 – 4:30 (and by appointment)
Phone: (305) 284-4013; E-mail: asimon@miami.edu

Course Objectives. Game theory is the mathematical study of rational strategy selection in conflict situations involving two or more interdependent actors (or “players”), where outcomes for each player separately (all hence all players collectively) depend, in part, on the choices made by “opposing” players, in light of the range of preferences for each player over all possible outcomes. The course is designed to provide upper level undergraduate students and graduate students with a firm grasp on the rudiments of noncooperative game theory, including, most notably, solution techniques for zero sum and non-zero sum games. Although the course is mainly intended for political science students, it also presents applications drawn from other academic disciplines such as economics, business administration, sociology and psychology.

Upon completion of the course students should have a sound appreciation of distinctions (and the practical consequences of distinctions) between pure strategies and mixed strategies, zero sum and non-zero sum games, two-player, three-player, and n-player games, games with perfect and imperfect information, games played once and repeated games. Moreover, students should learn valuable lessons about strategic behavior in business, politics, sports, international relations and military affairs, as well as useful techniques for achieving optimal outcomes in conflict situations that often arise in social, familial and campus settings.

Because this is an introductory course, no advanced mathematics is required. (Calculus is not a prerequisite). Nevertheless, this class provides a fast-paced and comprehensive introduction to a fairly rigorous subject. Commonsense and good analytical skills are essential.

Textbook: Games, Strategies, and Decision Making, Joseph Harrington, Jr.

Dimensions of Evaluation. Final grades will be determined in accordance with these criteria:

- Problem Sets (Three) 60% (20% each)
- Final Examination 30%
- Term Paper 10%
- Class Participation & Homework 10% (negative)*

General Requirements. Students are expected to regularly attend class. Failure to attend class with requisite regularity can lead to a disappointing grade, if only because material covered in class is likely to be emphasized on the problem sets and the final exam. Also, students are expected to be fully prepared when they attend class.

* Students may lose points for failure to attend class with required regularity, failure to contribute to classroom discussions and activities, and failure to timely complete all required homework assignments.
**Classroom Behavior.** The following requirements are strictly enforced:

- Students may use computers in class solely for purposes of taking notes.
- Students may not access the Internet for any reason in class. Students may not send or receive emails or instant messages in class.
- Students may use electronic devices in class to record lectures only upon the prior approval of the instructor.
- Students may use calculators in class. (But calculators are not at all necessary).
- All other electronic devices (including cell phones) are to be turned off. No texting is permitted in class.
- Students are expected to be fully attentive in class. As such, students may not use class time for personal reading or correspondence, or for any other matter not specifically related to this course.

Any student who violates any of these rules of behavior will be told to immediately leave the classroom. In the event of repeated violations, a student will be told to formally withdraw from the class.

**Required Reading Assignments.** Students must read all textbook assignments (and occasional handouts) listed in the attached Class Schedule. The specified reading assignment(s) for any given week must be completed before class, in order to fully comprehend material to be covered in that week’s class lecture.

Your instructor will occasionally post a brief document on the class Blackboard immediately after class which complements, elaborates or further explains some concept(s) covered in class. These documents have been specially prepared and/or selected for your edification. Students must read them ASAP.

**Recommended Reading Assignments.** Your instructor will periodically post some brief articles of interest on the class Blackboard. These articles, taken mainly from the popular press (i.e., newspapers, magazines and websites), describe how game theory can be applied in various real world settings. Students will find that these complementary articles are interesting, informative and instructive.

**Written Homework Assignments.** In addition to the required reading assignments students will be given a number of written homework assignments, as specified in the attached Class Schedule. These assignments are mainly intended to help students increase their familiarity with game theory concepts and build confidence in game theory solution techniques. As such, they are not graded per se. However, a lack of demonstrable effort will adversely affect a student’s final grade. Each week, when your instructor returns your homework assignments, he will also post a document on the class Blackboard containing detailed solutions to the assigned homework problems. Students are required to carefully read and review these documents.

**Work Groups.** One of the salient learning objectives of this course is to promote a better understanding of group dynamics and, in particular, the benefit of selfless behavior by interdependent actors for the attainment of optimal social welfare in (small or large) groups. Consequently, the class will be divided into an array of small work groups. Students in each work group are encouraged to do homework problems together and also to help each other prepare for exams. Members of each work group will also solve problems together in class. Likewise, in class, the work groups will sometimes “play games” with/against each other.
**Problem Sets.** The Class Schedule denotes specific weeks when your instructor intends to distribute problem sets. Think of the problem sets as take-home exams. Generally, the problem sets consist of exercises (i.e., games) to be solved based on principles and techniques learned in class. Students will have TWO days to submit their completed problem sets. Exact posting dates of problem sets, and due dates of completed problems sets, are specified in the attached Class Schedule.

When completing the problem sets students may rely on their class notes, posted class slides, material in your assigned textbook, your homework assignments and all posted answers thereto, but no other sources of information whatsoever. A STUDENT MUST DO HER/HIS OWN WORK. Absolutely no collaboration is permitted on problem sets. Students may NOT discuss (or attempt to discuss) the problems with other students in this class or with any other persons. Likewise, students may NOT access the Internet for any reason when working on the problem sets. Any violations of these rules shall be deemed a material violation of the UM Honor Code.

Timeliness and completeness are requisite virtues in this class. Students who fail to submit completed answers to problem sets in a timely manner will realize a material reduction in points, or no points at all, depending on the circumstances. No excuses will be recognized (and no extensions of time will be granted) except for university approved reasons strictly construed. After each PS is graded and returned, your instructor will post a document on the Blackboard containing detailed answers. It is absolutely essential that students read and review these documents, regardless of the grade you received on the PS. Before you tackle any new material it is important that you understand what you did wrong, and have a firm grasp of learning points you may have missed, on the most recent problem set. Therefore, reading and reviewing each of these documents is a supplemental reading assignment in this course.

**Class Cancellation Policy.** In the unlikely event a class is canceled (due to natural disaster, inclement weather, instructor illness, etc.) you are responsible for having done the work assigned on the syllabus and schedule of class assignments by the stated due date.

**Honor Code.** Needless to say, cheating, plagiarism, failure to do one's own work on problem sets, violating the prohibition against communication or collaboration and with others about exercises in problem sets, use of the Internet with regard to problem sets, reliance on any unapproved extraneous material when completing problem sets, and/or any other violation of the UM Honor Code will not be tolerated. Any student who violates these rules will receive a grade of “F” for the course and will be reported to the honor council. Any student with direct knowledge of any violation or attempted violation of these rules by any other student is required to report the incident immediately to the instructor. Any student who fails to timely report the incident shall be deemed equally culpable, and shall be penalized accordingly. These rules shall be strictly enforced. Govern yourself accordingly.

**Term Paper.** One of the overriding course objectives is to sensitize students to normative, prescriptive and descriptive uses of game theory – or, in other words, ways and means whereby the abstract games you learn in class facilitate a better understanding of "real world" problems outside of class. Consequently, each student in this course is
required to maintain a “journal.” Whenever you personally observe a competitive situation, a collective action dilemma, or a strategic interaction that can be explained, solved or modeled (formally or informally) by game theoretic principles, *make an appropriate entry in your journal.* Suitable material for journal entries can be found almost anywhere – on television, in the newspaper, around campus, at work, at home, at play – in almost every aspect of social, political, or economic life. Almost any real-life situation that involves bargaining, negotiation, strategic behavior, moves and counter-moves is amenable to a game theoretic interpretation. So, there is no shortage of potential source material for your journal. During the semester you are encouraged to go back and revise past journal entries to incorporate more detail about the salient facts and any additional comments about applicable game theoretic concepts.

On the last regular day of class, **Wednesday, April 24,** each student will submit a term paper consisting of type-written examples of applied game theory, drawn from entries in your journals. The papers will be graded on the following criteria:

- Number, diversity and creativity of examples.
- Proper application of game theoretic principles to each example.
- Depth of analysis,
- Neatness and presentation.

Term papers should include a minimum of five examples. However, there is no maximum number. Likewise, there are no page limitations, although a normative standard based on past experience is 15 to 20 pages in length exclusive of a cover page. Your instructor is mainly looking for well-developed case studies involving the proper application of game theory to real world situations, supported by formal models (i.e., proper “games”) similar to the models you studied in this course (and the games we played in class). Stated differently, your instructor is mainly interested in the quality of your paper. Nevertheless, sometimes quantity has a quality all its own. A substantial number of good examples of game theory in action can offset a lesser amount of detailed analysis of individual cases. Although there are no special format constraints, any citations and references should adhere to generally accepted academic criteria.

The underlying purpose of this exercise is to ascertain how well you understand the game theoretic principles that are covered in this course. *How well you understand these principles,* is, in part, manifested by your ability to identify and fully explain real world applications of game theory. Once you start seeing them, you will never stop seeing them; and you will therefore realize optimal benefit from your educational experience in this course. Remember, creativity counts. And, most importantly, so does originality. *As such, you must do your own work!* Students may not collaborate on their journals or final papers; and rules against plagiarism shall be strictly enforced.

**Final Examination.** Unlike the problem sets, the final examination is not a take home exam. It will be administered in class on the date and time indicated in the official UM final examination schedule. However, this test will be an *open note, open book exam,* meaning that students can rely on their textbooks, notes, homework assignments, and answers to problems sets when taking the exam. *However, students may not use their computers or personal communication devices for any purpose during the final exam.* Of course, standard prohibitions against cheating and other honor code violations are rigorously enforced with regard to the final exam.
## CLASS SCHEDULE

This schedule is subject to revision upon the instructor's sole discretion.

**Note:** Reading assignments from the textbook (and an occasional handout) are specified for each week's class. Each week's *reading assignment must be completed before coming to that week's class*. Immediately following most (but not all) classes your instructor will post an ancillary homework assignment (HW) on class Blackboard, consisting of some exercises from the textbook or other sources. Neatly written/typed answers to these assignments are due at the beginning of the next class. Problem Sets (PS) will be posted on the class Blackboard, and are due in your instructor's office, on the days and times indicated below.

<table>
<thead>
<tr>
<th>CLASS #</th>
<th>DATE</th>
<th>TOPIC</th>
<th>READ PAGES</th>
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<tbody>
<tr>
<td>CLASS 1</td>
<td>1/16</td>
<td>INTRODUCTION &amp; OVERVIEW</td>
<td>1-15</td>
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<tr>
<td>CLASS 2</td>
<td>1/23</td>
<td>BUILDING A MODEL: Games in Strategic Form &amp; Extensive Form</td>
<td>17-23, 27-30, 36-38, 39 bot - 41 top, 42 bot - 49, (briefly 291-296)</td>
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<tr>
<td>HW</td>
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<tr>
<td>CLASS 3</td>
<td>1/30</td>
<td>ZERO SUM GAMES: Dominance, Maximin, Mixed Strategy Solutions</td>
<td>97-99, 207-210; handout</td>
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<td>CLASS 4</td>
<td>2/06</td>
<td>DOMINANCE: In Non-Zero Sum Games</td>
<td>55-60, 64-66, 68-71 top, 76-79</td>
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<td><strong>PS 1</strong> Posted FRI, 2/08 @ 5:00 pm; due SUN, 2/10 @ 5:00 pm</td>
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<tr>
<td>CLASS 5</td>
<td>2/13</td>
<td>NASH EQUILIBRIUM: Pure Strategy Solutions</td>
<td>89-91 top half, 99-100, 109 bot - 111 top, 111-112 (Summary)</td>
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<tr>
<td>HW</td>
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<tr>
<td>CLASS 6</td>
<td>2/20</td>
<td>NASH EQUILIBRIUM: Equilibrium Selection, Trembling Hand Perfection</td>
<td>137-140; 141 (3d paragraph); handout</td>
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<tr>
<td>HW</td>
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<tr>
<td>CLASS 7</td>
<td>2/27</td>
<td>CLASSIC 2 x 2 GAMES: Prisoner's Dilemma, Chicken, Dove v. Hawk, Battle of the Sexes, Boxed Pigs, Stag Hunt</td>
<td>92-96, 71-73 top</td>
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<tr>
<td>HW</td>
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<td>CLASS 8</td>
<td>3/06</td>
<td>THREE-PERSON GAMES</td>
<td>73-75, 101-102, 109 (Fig. 4.19); handout</td>
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</table>
NO CLASS 3/13  SPRING RECESS

**PS 2** Posted SUN, 3/17 @ 4:30 pm; due TUE, 3/19 @ 4:30 pm †

**CLASS 9**  3/20  NASH EQUILIBRIUM:
**HW** Mixed Strategy Solutions

**CLASS 10**  3/27  SEQUENTIAL MOVE GAMES:
**HW** Backward Induction, Subgame Perfect
Nash Equilibrium, Forward Induction

**CLASS 11**  4/03  SEQUENTIAL MOVE GAMES:
**HW** Imperfect Information

**PS 3** Posted FRI, 4/05 @ 5:00 pm; due SUN, 4/07 @ 5:00 pm

**CLASS 12**  4/10  REPEATED GAMES: Finite, Indefinite,
**HW** and Infinitely Repeated Games

**CLASS 13**  4/17  EVOLUTIONARY GAME THEORY:
**HW** The Evolution of Cooperation

**CLASS 14**  4/24  Note: Student papers are due today.
DISCUSSION AND PRESENTATION

5/01 (WED)  **FINAL EXAMINATION**  8:00 – 10:30 pm

† Revised February 13, 2013