University at Albany
School of Criminal Justice
RPAD 705, Advanced Quantitative Analysis (Research Methods II)
Fall 2015

Time and Place:
- Mon 2:45pm -5:35pm Draper 246
- Wed 10:00am-11:30am Currently HS 006, looking for a computer room

Professor:
Shawn D. Bushway Ph.D.
220 Milne Hall (Will be moving to 324 Milne soon)
Wk (518) 591-8738 sbushway@albany.edu
The best way to contact me is via email. To ensure that I see your email, write “PAD 705” in the subject line, and sign your full name.

Office Hours:
Tuesday 3:00-4:30 pm and by appointment. I have found that students don’t make use of regularly scheduled office hours. However, I am in the office most days and I am willing to do whatever is necessary to facilitate appointments.

Course Goals:
1) Students will have a strong intuitive understanding of multivariate regression, and its various uses, including statistical inference and statistical forecasting/prediction.
2) Students will be able to perform sophisticated empirical analysis and interpret the results.
3) Students will be able to read and critique empirical analyses used in academic publications.

Prerequisites:
I am assuming basic familiarity with statistics at the level taught by PAD 505. Calculus is not required, but a conceptual understanding of calculus does make comprehension of the material easier. For PAD students, this course fulfills a core requirement, and, thus, your core GPA, which is evaluated as part of the Core Comprehensive review.

Expectations:
This is a 4 credit class. By university rules, that means that you are expected to spend 12 hours total on this class, 4 in class and 8 outside of class. I will not be surprised if you spend at least that much time outside of class. If you spend much more than ten hours, come see me – something may be wrong, and I may be able to help.

I know of no one who has survived advance statistics without some help from a study group. Study together, but make sure you are doing your own work. In the end, your ability to understand the material will be evaluated on an individual basis.
The material in these books often includes equations. Many students are afraid of equations. Don’t be – equations are awesome. They are very precise and concise ways of communicating complicated concepts. Take your time, and don’t be surprised if it takes you an hour to read 5 pages. You are not stupid – you are normal. This is a different kind of reading, and it takes a little getting used to if you have never done it before. Don’t be afraid to start and stop, and bounce between books. Also, you are free to use outside resources – the web is full of material related to these topics, and you might be able to find things (including Wikipedia, believe it or not), which help you understand these ideas. Although we will necessarily have a theoretical focus, please always keep the applications in mind.

**Book:**
Required
Econometric Models and Economic Forecasts Fourth Edition
Robert S. Pindyck and Daniel Rubinfeld

A Guide to Econometrics 6E
Peter Kennedy
The readings for Kennedy are intended to supplement P&R. The in-class RATS will focus on the material in P&R, not Kennedy directly. Kennedy is to be used as a resource when you didn’t understand P&R – go look it up in Kennedy. I promise you, you will keep Kennedy for the rest of your career. The joy of Kennedy is that everything is explained in three different ways, ranging from really basic to more complicated.

A Gentle Introduction to Stata, Fourth Edition (unless you are super confident with Stata)
Alan Acock (This book also helps with basic concepts, although the focus is on STATA. All STATA commands have technical descriptions in the online manual, and many people find them helpful for understanding.)

Optional Texts
Gujarati is an undergraduate econometrics text book that some people will find helpful if P&R is too hard on first read. I can’t tell you how many syllabi I have seen with P&R and Kennedy, with Gujarati as the crutch if you are struggling.

Miscellaneous articles and chapters, posted to Blackboard.

**Software:**
The recommended software package for this course is Stata 13 (although older versions should be acceptable, and 14 will also work). You do not have to buy Stata, but can purchase it directly at the following URL:
http://www.stata.com/order/new/edu/gradplans/gp-campus.html

There are three versions of Stata:
1. Stata/SE or Stata/MP – If you plan to do a lot of statistical analysis for your dissertation, I would suggest buying one of these versions of Stata. You may also wish to buy the Base Reference Material and Stat Transfer.
2. Stata Intercooled – If you may do some analysis, but not with large datasets (ie. Not over 2047 variables), this version should suffice.

3. Stata Intercooled (1 year license) – If you never plan to do statistical analysis for your work.

Do not buy Small Stata. Some of the datasets used in this class will be too large for that version. Finally, Stata is available on computers in the campus libraries and other laboratories throughout campus. When you are off campus, you can use the Virtual Information Commons to access Stata on your desktop. These resources should be utilized to complete your assignments.

I will not teach STATA, but will use STATA in the class. It is up to you to figure it out as we go along. Please use the extra time at the beginning of the semester (due to canceled classes) to get comfortable in STATA. Acock is an excellent guide, and there are other resources available on the internet if you need help.

Classroom Approach
This class uses a technique known as Team-Based Learning. Team-based Learning ([www.teambasedlearning.org](http://www.teambasedlearning.org)) is a type of active learning approach to classroom teaching that is part of the “flipped classroom” movement. The standard lecture class has the teacher present material in the class, and students do applications or learning exercises outside of class. In a flipped classroom, students do much of the concept acquisition outside of class through reading or other mixed media presentation, and then participate in applied learning activities in the classroom. Team-based learning is distinguished from other flipped classroom techniques by two features. First, team-based learning emphasized decision making during class time, in which students must use key course concepts to make decisions about real-life problems. Second, students spend all of their class time as members of permanent teams which facilitate decision making and ultimately, learning. Team work is done almost exclusively in the classroom, and part of the course grade comes from the team effort.

I first learned about Team-based Learning after arriving at UAlbany nine years ago. I have always done a lot of application but I struggled to motivate UAlbany students to apply concepts in the classroom. The technique has led to improved student outcomes (ie. student learning) in my classrooms and I am a strong supporter of this approach both at UAlbany and at national conferences. For more information about my journey towards TBL adoption, see [http://www.itlal.org/index.php?q=node/287](http://www.itlal.org/index.php?q=node/287)

To see an academic article on Team Based Learning on which I am a co-author, please see the following website: [https://jstamatel.wordpress.com/courses/](https://jstamatel.wordpress.com/courses/)

Academic Honesty
The University’s standards for integrity are at the website below: [http://www.albany.edu/graduatebulletin/requirements_degree.htm#standards_integrity](http://www.albany.edu/graduatebulletin/requirements_degree.htm#standards_integrity)

Avoid plagiarism by properly acknowledging material and ideas taken from other sources. The University of Albany Library offers a useful tutorial on plagiarism and how to avoid it: [http://library.albany.edu/usered/plagiarism/index.html](http://library.albany.edu/usered/plagiarism/index.html)
Grading Requirements and Procedures

RATS and Projects:
There will be 6 short, multiple choice Readiness Assessment Tests (RATs) given during the course. (The same RATs will be given to individuals and teams.) There will be a number of in-class team exercises, that will be graded, usually preceded by take home problem sets. There will be a midterm and a final.

Grading Criteria:
The grades will be determined by scores in three major performance areas:

Individual Performance, Team Performance and Team Contribution.

Grade Weights and Percentages

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<thead>
<tr>
<th>Component</th>
<th>Grade Weights</th>
<th>Of Total</th>
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<tbody>
<tr>
<td>1. Individual performance</td>
<td></td>
<td></td>
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<tr>
<td>Individual Readiness Assessment Tests</td>
<td>25</td>
<td>60%</td>
</tr>
<tr>
<td>Mid Term</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>40</td>
<td></td>
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<tr>
<td>2. Team Performance</td>
<td></td>
<td>30%</td>
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<tr>
<td>Team Readiness Assessment Tests</td>
<td>25</td>
<td></td>
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<tr>
<td>In Class Team Exercises</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Mid Term</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>3. Team Contribution (Evaluated by your teammates)</td>
<td>10%</td>
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Evaluating Team Contribution:
Each individual will rate the helpfulness all of the other members of their teams at the conclusion of the midterm and final exam. The midterm evaluation will be for practice and to help teammates adjust their behavior. The one after the final will be part of the final grade. Given that your teammates will be stuck with your during each and every class, they are in the best position to evaluate your contribution to the team.

Individual Team Contribution scores will be the average of the points they receive from the members of their team. Assuming arbitrarily that there five members in a team, an example of this procedure would be as follows. Each individual must assign a total of 40 points to the other four members in their team. Raters must differentiate between their teammates in their ratings and they can only give integer scores (This means that each rater would have to give at least one score of 11 or higher and at least one score of 9 or lower). As a result, Team Contribution scores will produce differences in grades only within teams. Consequently, team members can’t help everyone in their team get an A by giving them a high peer evaluation score. The only way for everyone in a team to earn an A is by doing an outstanding job on the individual and team exams and projects. These scores will be translated into a final participation score as follows:
Less than 20 D (60) (You have to be the world’s worst teammate to get less than 20 points in this system. I have only seen it happen once.)
20-29 = C (75)
30-32 = B- (80)
33-38 = B (85)
39-42 = B+ (88)
43-47 = A- (92)
48 or higher  A (95)

Teams with more than 5 teammates will use a slightly different, but analogous scale. For those of you who are good at math, you will realize that you can collaborate to give each member of the team the same grade (40 points). This is fine, but you all have to agree ahead of time to get the same grade or it won’t work (there is no talking during the evaluations). If everyone collaborates, and everyone writes a statement indicating that they honestly believe that all the contributions were equal, a 40 will translate to a 90, rather than an 88. In addition to the point totals, you will be asked to provide feedback on your teammates strengths as well as provide constructive feedback on areas where the person could improve.

**Determination of Final Grades:**
The final grades will be determined as follows:
1) A raw total score will be computed for each student in each major performance area (In the individual performance area, this will be a weighted combination of the sum of the individual Readiness Assessment Test scores and the final exam score, in the team performance area, this will be the sum of the scores on each of the graded team assignments and the Team Contribution score will be the average of the peer evaluations received from the other members of his or her team.)
2) Total scores will be computed by multiplying the raw scores in each area by the grade “weight” (see above).

3) Course grades will be based on each individual’s standing in the overall distribution of total individual scores within the class. (Note: When this procedure is followed: a) **the actual impact of any score on an individual students final grade depends on both his or her actual score and also how high or low he or she scores relative to other members of the class and, b) the conventional practice of 90% is an A, 80% is a B, etc. simply does not apply.** I will give all A’s if everyone performs at an equally high level (this has never happened, but it could). In general, I do not anticipate giving grades of less than B-, unless a student has clearly demonstrated that they do not understand the material. This is a core class, and it is important that you take it seriously.

**Students with Disabilities**
If you have a documented disability and wish to discuss academic accommodations with me, please contact me. All reasonable efforts will be made to accommodate your needs.

**Schedule** – Please note this schedule is preliminary, and reading assignments may change. Please check on Blackboard.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
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<tr>
<td>8/31/15</td>
<td>RAT 1 Statistics Review</td>
<td>PR Ch. 2, Degroot and Schervish Probability and Statistics 4th edition (available online, google “degroot pdf”). 3.1 -3.4, 4.1-4.6, 5.1,5.2, 5.4,5.6 It’s a bit mathy, but it is very clearly written, and has great examples. It will help you think about the basic concepts. Focus on the discrete distributions, and make sure understand the basic ideas about pdfs and cdfs. If you find DeGroot too hard, you can also pick up almost any introductory graduate (MA level) statistics text. One that I like is McClave and Sincich A First Course in Statistics (seven edition, Chs 1-5). There are many online sources – for example, this covers much of the basic material in an intuitive way. <a href="http://stattrek.com/tutorials/ap-statistics-tutorial.aspx">http://stattrek.com/tutorials/ap-statistics-tutorial.aspx</a> Also to be read (for 9/2), but not on RAT Acock Chapters 1-7 <a href="http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0475.2012.00578.x/abstract">http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0475.2012.00578.x/abstract</a> <a href="http://humrep.oxfordjournals.org/content/20/10/2923.full">http://humrep.oxfordjournals.org/content/20/10/2923.full</a></td>
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<tr>
<td>9/7/15</td>
<td>Labor Day No Class</td>
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<td>9/14/15</td>
<td>Rosh Hoshanah No Class</td>
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<tr>
<td>9/21/15</td>
<td>RAT 2 Basic Regression</td>
<td>P&amp;R Ch. 1 and Ch. 3 Not on RAT Kennedy Ch 1 &amp; 2</td>
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<tr>
<td>9/28/15</td>
<td>Basic Regression Continued</td>
<td>Paper to be listed on Blackboard Acock 8</td>
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<tr>
<td>10/5/15</td>
<td>RAT 3 Multivariate Regression</td>
<td>P&amp;R Ch 4 (not 4.4.) and 5 Kennedy 3-6, 15</td>
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<tr>
<td>10/12/15</td>
<td>Multivariate Regression continued</td>
<td>Acock 10</td>
</tr>
<tr>
<td>10/19/15</td>
<td>Midterm</td>
<td>Exam will be reviewed during Lab</td>
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<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
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| 7    | 10/26/15 | Violations of the assumptions of the models  
Serial Correlation, Heteroscedasticity, Multicollinearity and Endogeneity (The case for instrumental variables) | P&R 4.4, 5.6, 7  
Kennedy 7-12 |
| 8    | 11/215  | 7 continued                                                            | Papers to be posted |
| 9    | 11/9/15 | RAT 5 Forecasting and Time Series                                      | P&R Ch. 8, 15.16  
Kennedy 19.20 |
| 10   | 11/16/15| 9 Continued                                                            | Paper(s) to be posted |
| 11   | 11/23/15| RAT 6 Maximum Likelihood, Qualitative Dependent Variables  
(Logit, probit), Count variables, Limited Dependent Variables. | P&R 10, 11  
Kennedy 16.17 |
| 12   | 11/30/15| 11 Continued                                                           | Paper(s) to be posted |
| 13   | 12/6/15 | Special Topics – Factor Analysis, Review                               | To be distributed.  
Acock 12 |
| 12/11/15 | Final Exam | Same room, 3:30-5:30                                                   |