ADEC 7320 Econometrics, 3 Credits
Woods College of Advancing Studies
Fall 2017 Semester, October 23 – Dec 20, 2017
Class meeting day/time: TBD

Instructor Name: Dr. Nathan Bastian (Prof. B)
BC E-mail: bastiann@bc.edu
Phone Number: (570) 809-3619
Office: Remote
Office Hours: By appointment

Boston College Mission Statement
Strengthened by more than a century and a half of dedication to academic excellence, Boston College commits itself to the highest standards of teaching and research in undergraduate, graduate and professional programs and to the pursuit of a just society through its own accomplishments, the work of its faculty and staff, and the achievements of its graduates. It seeks both to advance its place among the nation’s finest universities and to bring to the company of its distinguished peers and to contemporary society the richness of the Catholic intellectual ideal of a mutually illuminating relationship between religious faith and free intellectual inquiry.

Boston College draws inspiration for its academic societal mission from its distinctive religious tradition. As a Catholic and Jesuit university, it is rooted in a world view that encounters God in all creation and through all human activity, especially in the search for truth in every discipline, in the desire to learn, and in the call to live justly together. In this spirit, the University regards the contribution of different religious traditions and value systems as essential to the fullness of its intellectual life and to the continuous development of its distinctive intellectual heritage.

Course Description
This course develops the foundations of predictive data analytics by introducing the key concepts of applied econometrics, the application of statistical tools used to estimate economic relationships. The main topics covered in this course include: simple and multiple linear regression, variable selection and shrinkage methods, binary logistic regression, count regression, weighted least squares, robust regression, generalized least squares, multinomial logistic regression, generalized linear models, and panel regression. The course is heavily weighted towards practical application using the R statistical programming language and data sets containing missing values and outliers. The course also addresses issues of exploratory data analysis, data preparation, model development, model validation, and model deployment.

Textbooks & Readings (Required)
- Linear Models with R, by Julian J. Faraway. (LMR)
- Extending the Linear Model with R, Julian J. Faraway. (ELMR)

Textbooks & Readings (Recommended)
**Required Software**
The primary software environment is the R statistical programming language, which can be downloaded for free from [http://www.r-project.org](http://www.r-project.org). RStudio is the recommended interface for the R statistical programming language software, which can also be downloaded for free at [http://www.rstudio.org](http://www.rstudio.org).

**Canvas**
Canvas is the Learning Management System (LMS) at Boston College, designed to help faculty and students share ideas, collaborate on assignments, discuss course readings and materials, submit assignments, and much more - all online. As a Boston College student, you should familiarize yourself with this important tool. For more information and training resources for using Canvas, click here. In the case of any technical difficulties or concerns, please contact canvas@bc.edu or 617-552-HELP (4357) for immediate assistance. NOTE: Canvas requires particular computer specifications and wifi access. It is important that you plan accordingly, particularly for courses that have online components.

**Course Objectives**
1. Students will demonstrate a practical understanding of the fundamental applied econometric modeling techniques across cultural settings and will learn the impact of culture, gender, and age in econometrics as demonstrated by the analysis of real-world data sets.
2. Students will demonstrate ethical data usage and data understanding pertaining to the selection of appropriate types and combinations of econometric models given particular business situations as demonstrated by the building, assessment and implementation of models.
3. Students will gain intermediate level, practical knowledge of data analysis and econometrics, as demonstrated by the successful completion of homework assignments and a group project, contributions to class discussions, and attendance of the course lectures.
4. Students will be able to effectively use a statistical/econometric software package, as demonstrated by the implementation of various applied econometric techniques using R to build and deploy specific models based on real-world business problems to learn how to enhance business capabilities and extend the value of existing data.

**How does this course work?**
The course is conducted entirely online via Canvas. Each week, the student will complete assigned readings from the required textbooks, watch lecture videos, complete optional (but recommended) textbook exercises, complete homework assignments, and participate in the discussion board. There is also a final course project and presentation. Students are expected to complete all deliverables by their assigned due dates.

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Points</th>
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<tbody>
<tr>
<td><strong>Homework Assignments</strong></td>
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<tr>
<td>- There are 3 homework assignments (200 points each) used to re-enforce course concepts and provide implementation experience in R.</td>
<td>60%</td>
<td>600 points</td>
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<tr>
<td><strong>Weekly Discussion Forum Participation</strong></td>
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<td>- There are 8 weekly discussion forum assignments (10 points each) on Blackboard. The discussion forum is used for question and answer (Q&amp;A) among classmates.</td>
<td>10%</td>
<td>80 points</td>
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<tr>
<td>- Each student must post at least one question each week, as well as answer at least one other student’s question.</td>
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In order to receive full credit, you must submit your Q&A question by Wednesdays, as this will best facilitate class discussion.

**Final Course Project Report**
- Students will form a Critical Thinking Group and conduct a final course project using the econometric modeling techniques covered in class to solve a real-world problem.
- Only one project report should be submitted per group.

<table>
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<tr>
<th>Final Course Project Presentation</th>
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<tr>
<td>- Student groups will present the final course project.</td>
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**Grading Scale**
Your grade will be based on your final weighted average score. The letter grade will be assigned in accordance with the graduate grading system for Woods College:

<table>
<thead>
<tr>
<th>Quality of Performance</th>
<th>Letter Grade</th>
<th>Range %</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent - work is of exceptional quality</td>
<td>A</td>
<td>93 - 100</td>
<td>4.00</td>
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<tr>
<td></td>
<td>A-</td>
<td>90 - 92.9</td>
<td>3.67</td>
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<tr>
<td>Good - work is above average</td>
<td>B+</td>
<td>87 - 89.9</td>
<td>3.33</td>
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<tr>
<td>Satisfactory</td>
<td>B</td>
<td>83 - 86.9</td>
<td>3.00</td>
</tr>
<tr>
<td>Below Average - passing but does not count toward degree</td>
<td>B-</td>
<td>80 - 82.9</td>
<td>2.67</td>
</tr>
<tr>
<td>Poor - passing but not for degree credit</td>
<td>C</td>
<td>70 - 79.9</td>
<td>2.00</td>
</tr>
<tr>
<td>Failure - not passing</td>
<td>F</td>
<td>&lt; 70</td>
<td>0.00</td>
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All students can access final grades through Agora after the grading deadline each semester. Students who complete course evaluations can access grades earlier, as they are posted.

**Discussion Board Etiquette**
The purpose of the discussion board in general is to allow students to freely exchange ideas. It is imperative to remain respectful of all viewpoints and positions and, when necessary, agree to respectfully disagree. While active and frequent participation is encouraged, cluttering a discussion board with inappropriate, irrelevant, or insignificant material will not earn additional points and may result in receiving less than full credit. Frequency is not unimportant, but content of the message is paramount. Please remember to cite all sources (when relevant) in order to avoid plagiarism.

**Deadlines and Late Work**
Unless otherwise noted, all work is due on the assigned day by 11:59 PM (Eastern Time). This includes homework assignments, projects, and participation in the discussions. Late work is not accepted, unless pre-coordinated with the instructor.
Course Assignments
It is expected that you will spend 10 hours per week on out-of-class assignments and exercises. These are listed below. Please note that some weeks will require more time and some weeks less time but the average is approximately 10 hours per week over the term.

Course Schedule

<table>
<thead>
<tr>
<th>Week / Dates</th>
<th>Topic</th>
<th>Readings</th>
<th>Key Tasks</th>
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<tbody>
<tr>
<td><strong>Week #1</strong> 10/23 – 10/29</td>
<td>Simple Linear Regression: Estimation, Inference, Prediction and Explanation</td>
<td><em>MARR</em> – Ch. 1, 2</td>
<td>- Discussion #1 Due</td>
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<td></td>
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<td><em>LMR</em> – Ch. 1 – 5</td>
<td>- HW #1 Assigned</td>
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<tr>
<td><strong>Week #2</strong> 10/30 – 11/5</td>
<td>Simple Linear Regression: Diagnostics and Transformations</td>
<td><em>MARR</em> – Ch. 3</td>
<td>- Discussion #2 Due</td>
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<td><em>LMR</em> – Ch. 6, 9, 14</td>
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<tr>
<td><strong>Week #3</strong> 11/6 – 11/12</td>
<td>Multiple Linear Regression: Missing Data, Diagnostics and Transformations</td>
<td><em>MARR</em> – Ch. 5, 6</td>
<td>- Discussion #3 Due</td>
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<td></td>
<td></td>
<td><em>LMR</em> – Ch. 7, 13</td>
<td>- HW #1 Due</td>
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<td>- HW #2 Assigned</td>
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<tr>
<td><strong>Week #4</strong> 11/13 – 11/19</td>
<td>Binary and Multinomial Logistic Regression</td>
<td><em>MARR</em> – Ch. 8</td>
<td>- Discussion #4 Due</td>
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<td><em>ELMR</em> – Ch. 2, 7</td>
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<tr>
<td><strong>Week #5</strong> 11/20 – 12/3</td>
<td>Variable Selection and Shrinkage Methods</td>
<td><em>MARR</em> – Ch. 7</td>
<td>- Discussion #5 Due</td>
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<td></td>
<td><em>LMR</em> – Ch. 10, 11</td>
<td>- HW #2 Due</td>
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<td>- HW #3 Assigned</td>
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<tr>
<td><strong>Week #6</strong> 12/4 – 12/10</td>
<td>Count Regression</td>
<td><em>ELMR</em> – Ch. 5</td>
<td>- Discussion #6 Due</td>
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<tr>
<td><strong>Week #7</strong> 12/11 – 12/17</td>
<td>Weighted Least Squares, Robust Regression, and Generalized Least Squares</td>
<td><em>MARR</em> – Ch. 4, 9</td>
<td>- Discussion #7 Due</td>
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<tr>
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<td></td>
<td><em>LMR</em> – Ch. 8</td>
<td>- HW #3 Due</td>
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<tr>
<td><strong>Week #8</strong> 12/18 – 12/20</td>
<td>Generalized Linear Models and Panel Regression</td>
<td><em>ELMR</em> – Ch. 8, 9, 11</td>
<td>- Discussion #8 Due</td>
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<td></td>
<td>- Project Presentations Due</td>
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<td></td>
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<td>- Project Report Due</td>
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Written Work
Woods College students are expected to prepare professional, polished written work. Written materials must be typed and submitted in the format required by your instructor. Strive for a thorough yet concise style. Cite literature appropriately, using APA, MLA or CLA style per your instructor’s requirements. Develop your thoughts fully, clearly, logically and specifically. Proofread all materials to ensure the use of proper grammar, punctuation and spelling. For writing support, please contact the Connors Family Learning Center.

Attendance
Attending class is an important component of learning. Students are expected to attend all class sessions. When circumstances prevent a student from attending class, the student is responsible for contacting the instructor before the class meets. Students who miss class are still expected to complete all assignments and meet all deadlines. Many instructors grade for participation; if you miss class, you cannot make up
participation points associated with that class. Makeup work may be assigned at the discretion of the instructor. If circumstances necessitate excessive absence from class, the student should consider withdrawing from the class. All course goals, session learning objectives, and assessments are supported through classroom elements that can be accessed at any time. To measure class participation (or attendance), your participation in threaded discussion boards is required, graded, and paramount to your success in this class. If you are unable to attend a scheduled synchronous meeting, you will need to make alternative arrangements with the instructor.

Consistent with BC’s commitment to creating a learning environment that is respectful of persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to observe their religious holidays without jeopardizing their academic status. Students are responsible for reviewing course syllabi as soon as possible, and for communicating with the instructor promptly regarding any possible conflicts with observed religious holidays. Students are responsible for completing all class requirements for days missed due to conflicts with religious holidays.

Accommodation and Accessibility
Boston College is committed to providing accommodations to students, faculty, staff and visitors with disabilities. Specific documentation from the appropriate office is required for students seeking accommodation in Woods College courses. Advanced notice and formal registration with the appropriate office is required to facilitate this process. There are two separate offices at BC that coordinate services for students with disabilities:

- The Connors Family Learning Center (CFLC) coordinates services for students with LD and ADHD.
- The Disabilities Services Office (DSO) coordinates services for all other disabilities.

Find out more about BC’s commitment to accessibility at www.bc.edu/sites/accessibility.

Scholarship and Academic Integrity
Students in Woods College courses must produce original work and cite references appropriately. Failure to cite references is plagiarism. Academic dishonesty includes, but is not necessarily limited to, plagiarism, fabrication, facilitating academic dishonesty, cheating on exams or assignments, or submitting the same material or substantially similar material to meet the requirements of more than one course without seeking permission of all instructors concerned. Scholastic misconduct may also involve, but is not necessarily limited to, acts that violate the rights of other students, such as depriving another student of course materials or interfering with another student’s work. Please see the Boston College policy on academic integrity for more information.