School of Administrative Studies
Faculty of Liberal and Professional Studies

AP/ADMS 2310 3.00
BUSINESS STATISTICS THROUGH APPLICATIONS

WINTER 2021
Friday 2:30-5:30 pm over Zoom
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*As Socrates teaches us, when this happens*
*– when our own definitions produce results that seem intuitively wrong to us –*
*it's because we're not aware of what we really think*
*~ David Graeber (1961-2020)*

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1. Overview: Learning Statistics

   The course focuses on making sense of statistics rather than solving something to compute something or proving some equations to come up with more equations. The course is designed to empower you to develop your statistical literacy in your own way as a lifelong learner.

   I hope with the design of this course I could help put you more at ease with statistics so when you encounter them in business and society as well as in your professional career and your personal life you can make some sense of them.

   In general, if we are fortunate enough, by the end of the course you will be able to not only understand the numbers you encounter, produce and/or visualize but also make good use of your handy work in communicating your ideas.

   Part debunking and part bungee jumping, the course is not standard introductory statistical fare. There are many excellent standard introductory statistics courses at York so if you are interested in those you would be well served.

2. Learning Outcomes: Learning to Get the Best Available Version of the Truth From Data

   The learning outcomes could be transformative if students want them to be, no matter what the subject of a course is. Being held hostage in the quagmire of post-truth delusions, we could safeguard a scintilla of hope that whatever that is left of our idealism is not destined for demolition by daring ourselves to ask: does it have to be this way? If students are willing, at the end of our time together, students would be able to ask the tough questions needed in challenging the status quo.

   The course is an introductory course about applied statistics, but it is about a lot more than that. You will learn how to use Stata (www.stata.com) to run some simple analyses and visualize data. More importantly, you will learn statistical literacy for self-defense in this post-truth age.

At university you learn to become not only a productive employee but also an informed and responsible citizen. Like university studies in general, the course is designed to develop your capabilities in critical thinking, information literacy, effective communication as well as your sense of your responsibility.

*Critical thinking*. A big challenge in your daily experience is to live with ambiguity. The world is not neatly organized, and it won't organize itself for you. But you can make sense of what you initially see as disorganization for yourself if you want to. Hopefully this course will give you ample opportunities to learn to face the messy world.

*Information literacy*. In our society another big challenge is to live with information overload. The massive information flow does not come with navigation manuals or come in handouts or PowerPoint slides. But you can separate the signals from the noises if you want to. Hopefully this course will give you ample opportunities to learn to separate the good from the bad information.

*Effective communication*. Whether some ideas become entrenched often rests on how they are argued. Agenda setting is cruel as at times the most compelling arguments beat the most sensible ideas. But you can be precise and concise in making your arguments if you want to. Hopefully the course will give you ample opportunities to learn to cut to the chase.

*A sense of your responsibility*. University education is to enlighten, not to indoctrinate to conform. Sadly, nowadays our society allows university education to become just a big broken promise. But if you want to, you can help make things right by working hard to be responsible starting as responsible learners by solving the problems you are asked to solve on your own rather than just giving up and asking others to solve them for you. Hopefully the course will give you ample opportunities to learn to nurture your sense of responsibility.

On how to pursue the above learning outcomes in this course, here are three actionable suggestions:

- *Pay attention*. Once you start paying attention, many seemingly unanswerable questions will end up as obtainable information that you can look up.

- *Prepare relentlessly*. Students are expected to do most of their work outside the classroom both before and after class, and they are expected to demonstrate their outside work with their engagements inside the classroom.

- *Own it*. When you have a problem, look for the solution. Whenever something does not go your way, ask "What have I done wrong and how can I do better?

Your course grade is just a reflection of your performance in the course A grade is just a grade. In five years no one will care about what you get as a student in this course. But people do care who you are as a human being – whether you care not only about your own self-interests but also about others' well-being.

Students will earn the grades they get and will get the grades they earn. Thus, students are expected to take full responsibilities for studying and keeping up with the fast pace of the course. No special consideration will be given to students who don't get the grades they want due to reasons not required to be considered by university policies. Students shouldn't negotiate for marks they didn't earn, and all academic queries on marks if warranted should be made on an academic basis. For example, claiming that you have worked very hard or you have never received such a low grade won't be sufficient. By the same token, claiming that you need such a grade to advance to the next level, keep your scholarship or graduate or get a job won't be sufficient either.

3. Course Materials: Basic Tools

No one can predict the future accurately but we all could learn from the past to not only understand the present but also make an educated guess about the future. In working through the course materials, students will gain a sense of the convergence of the past, the present and the future.

Students are required to make good use of the following:

- Stata/IC [student license for six months for in-class assignments and cap-stone project]
- Introductory Business Statistics [free Kindle textbook for students' own reference at home]
- Something Doesn't Add Up: Surviving Statistics in a Number-Mad World [the designated Kindle book for reading diary that accounts for 35% of the course grade]

4. Teaching Approach: Use What It Is to Probe What It Could Be

In the course, we will learn statistical literacy by doing in each class. We will build our own toy datasets together. We will explore the toy datasets with Stata in class together. We will graph our results with Stata together.

In each class the process will start with a demonstration on Zoom a step that can be implemented in Stata. After that students will be asked to implement the step on their own computers in class in real time. After students' implementation, students will be asked questions about the step. Based on the answers from students, the next step will be shown to students and the process will start again.

Each step will build on prior steps in real time, and each class will build on prior classes in real time. Given the learning approach, the course will NOT be recorded as not attending a class defeats the purpose of the class. No class is designed to be missed. Given the pace of the course, students missing any class will be at their own peril no matter how hard I try to accommodate their absence.

In addition to using Stata, all students are required to use their York University email accounts – perhaps through Outlook – for ALL course correspondences [all York students can download MS Office for free at https://yuoffice.yorku.ca; you don't need to log into, for example, MS Word to use your downloaded software]. All emails should be sent to taxlaw@yorku.ca. At times functions follow forms. To give you a sense of this part of the design for the course, the subjects of all your email submissions are required to have "2310-(your last name)-(your first name)-(your student ID)-(the subject of the email depending on the assignment)". The "-" is a hyphen.

Students are expected to learn to find answers on their own. If after exhausting all avenues you still think you cannot find answers on your own please follow the course email protocol as stated above to send an email to taxlaw@yorku.ca. If you don't get any reply within 48 hours, you should assume that you are expected to have the capability to find your answer on your own.

I am eager to talk shop all the time. But to make sure that any academic discussion with any student will be shared with all students in the course so all students can benefit from it, please follow course email protocol to email the questions to taxlaw@yorku.ca so I can incorporate your wonderful contributions into the development of our course for all students. I am confident that such an approach is more conducive to learning than, let's say traditional office hours, given the design of the course.

5. Evaluation: Less is more

The evaluation focuses on what students are expected to learn in university studies – information literacy, critical thinking and effective communication as well as responsibility. All students will be graded and ranked in comparison to their peers. Very specific submission and presentation protocols of work done for the course will only be explained in class. Failure to follow the protocols could lead to failures in the course. Feedbacks to students' learning progress will be embedded weekly in class so students can learn from each other. Tentative marks will be posted on eClass by the drop date. A final letter grade for the course will be given to each student at the end of the academic year based on the following components.

5.1. *Up to 11 in-class online polls (15%)*. As an attempt to make the course reflect the students and to modify the course along the way accordingly, students are asked to participate in online polls on a variety of issues in building our toy datasets in specific time slots in class. Statistical analyses of the data collected will be shared in class as indicated above. Students can't participate in the polls in any other time. No make-up polls will be available.

5.2. *Up to 11 very short in-class online quizzes (15%)*. As an attempt to gauge students' learning progress and to modify the course along the way accordingly, students are asked to complete very short in-class quizzes on the use of Stata in analyzing the toy datasets that will be shown in class in specific time slots in class. Students can't participate in the quizzes in any other time. No make-up quiz will be available.

5.3. *Reading diary (35%)*. As an attempt to help students develop an academic habit, students are asked to read a part of the designated Kindle book as indicated above and log their work product each day throughout the term. A special Excel spreadsheet is available on eClass as the off-line logbook for the exercise. Logistics including how to compile the reading diary and how to submit the reading diary are discussed in class. The deadline for submission will be 11:59 pm Tuesday April 6. Very specific submission protocol must be followed. Submissions that do not follow the very specific submission protocol will not be graded. No extension will be granted.

5.4. *Capstone project (35%)*. As an attempt to encourage students to use real data to run their analyses, each student will be asked to prepare a Stata do-file (like a computer program) to

answer a designated research question. The research question will be unveiled in class near the end of the course. Logistics including how to tackle the capstone project and how to submit the capstone project will be discussed after the reveal. The deadline for submission will be 11:59 pm Friday April 16. Very specific submission protocol must be followed. Submissions that do not follow the very specific submission protocol will not be graded. No extension will be granted.

6. Tentative Schedule: Learning by doing

*Again, students are expected to learn by doing in real time in class. In each class the use of Stata for data analysis will be demonstrated, and students are expected to follow the instructions to perform analyses on their own computers in real time in class. The sequence of topics could change, and any change will reflect in the latest version of the outline. Under each topic below, a few key items in italics along with sample Stata commands in courier bold are listed for illustrative purposes. All Stata commands have options, which are not listed. All listings under topics are non-exhaustive. In the spirit of the real-time learning-by-doing approach, more details of each class will be revealed in each class.* ***Please note that each class builds on the previous one so missing any class is not an option. My academic advice to students is that if they cannot attend all classes in full they might want to consider taking the course in the future in their best academic interests.***

Class 1. Jan. 15: How the course works
*Course administration, learning by doing in real time, looking for patterns in distributions …*

**Using some Stata commands to be introduced in the course …**

Class 2. Jan. 22: Stata demo
*Showing what you can do with Stata …*

**Using some Stata commands to be introduced in the course …**

Class 3. Jan. 29: Surveys and experiments
*Collecting data properly …*

**gen**
**replace**
**sort**
**merge 1:m**
…

Class 4. Feb. 5: Exploratory data analysis
*Means, median, standard deviation …*

**codebook**
**sum**
**list**
**table**
**tabstat**

**graph bar**
**lowess**
**twoway**
**scatter**
**qfit**
…

Class 5. Feb. 12: Additional explorations – the normal distribution
*The 65-95-99.7 rule, law of large numbers, central limit theorem, hypothesis testing, confidence intervals*
…

**histogram**
**graph box**
…

Class 6. Feb. 26 & Class 7. Mar. 5: Means comparisons
*t-test, ANOVA …*

**ttest**
**oneway**
**…**

Class 8. Mar. 12 & Class 9 & Mar. 19: Categorical data analysis
*Contingency table, chi-square test …*

**tab**
**csgof [start with how to install]**
**…**

Class 10. Mar. 26 & Class 11. Apr. 9: Correlation & regression
*r, R-squared, standard error …*

**pwcorr**
**reg**
**margins**
**marginsplot**
**eststo [start with how to install]**
**esttab [start with how to install]**
…

Class 12 – Apr. 12: Applied statistics
*Statistical literacy …*

**Using some Stata commands introduced in the course …**

**ADAPTED STANDARDIZED INFORMATION**

**From York University**

Please note that this is a course that depends on remote teaching and learning. There will be no in-person interactions or activities on campus. eClass, Zoom and the university's email network will be used in this course.

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Students shall note that Zoom is hosted on servers in the U.S. This includes recordings done through Zoom. If you have privacy concerns about your data, provide only your first name or a nickname when you join a session. The system is configured in a way that all participants are automatically notified when a session is being recorded. In other words, a session cannot be recorded without you knowing about it. Please review the technology requirements and FAQs for eClass [https://lthelp.yorku.ca/95440-student-faq].

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In this course, we strive to maintain academic integrity to the highest extent possible. Please familiarize yourself with the meaning of academic integrity by completing SPARK's Academic Integrity module at the beginning of the course [https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/]. Breaches of academic integrity range from cheating to plagiarism (i.e., the improper crediting of another's work, the representation of another's ideas as your own, etc.). All instances of academic dishonesty in this course will be reported to the appropriate university authorities, and can be punishable according to the Senate Policy on Academic Honesty [https://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/].

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All materials prepared for this course at York University are the intellectual property of members of the 3520 teaching team unless otherwise stated. This can include but is not limited to the following materials: spoken and written presentations; assignment handouts and instructions. Course materials should only be used by students enrolled in this course. As a student in this course, you may not publish, post on an Internet site, sell, or otherwise distribute any of this work without the instructor's express permission. Unauthorized or commercial use of these materials is strictly prohibited. Copying this material for distribution (e.g. uploading material to a commercial third-party website, or online sharing of course material with people outside of the course) may lead to a charge of misconduct under York's Code of Student Rights and Responsibilities [https://oscr.students.yorku.ca/student-conduct] and the Senate Policy on Academic Honesty. In addition, you may face legal consequences for any violation of copyright law.

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While all students are expected to satisfy the requirements of their program of study and to aspire to achieve excellence, the university recognizes that persons with disabilities may require reasonable accommodation to enable them to perform at their best. For more information about this policy, please refer to these guidelines and procedures: Academic Accommodation for Students with Disabilities [https://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-guidelines-procedures-and-definitions/]. The university encourages students with disabilities to register with Student Accessibility Services [https://accessibility.students.yorku.ca] to discuss their accommodation needs as early as possible in the term. An Accessibility Counsellor will help you establish recommended academic accommodations, which will then need to be communicated to your course instructor(s) as necessary. Please let the course instructor(s) know as early as possible in the term if you anticipate requiring academic accommodation, so that your accommodation needs can be discussed and considered within the context of this course.

**From SAS**

**Deferred Final Exams:** Deferred standing may be granted to students who are unable to write their final examination at the scheduled time or to submit their outstanding course work on the last day of classes. Details can be found at http://myacademicrecord.students.yorku.ca/deferred-standing. ... No further extensions of deferred exams shall be granted. The format and covered content of the deferred examination may be different from that of the originally scheduled examination. The deferred exam may be closed book, cumulative and comprehensive and may include all subjects/topics of the textbook whether they have been covered in class or not.

**Academic Honesty**: The Faculty of Liberal Arts and Professional Studies considers breaches of the Senate Policy on Academic Honesty to be serious matters. The Senate Policy on Academic Honesty is an affirmation and clarification for members of the University of the general obligation to maintain the highest standards of academic honesty. As a clear sense of academic honesty and responsibility is fundamental to good scholarship, the policy recognizes the general responsibility of all faculty members to foster acceptable standards of academic conduct and of the student to be mindful of and abide by such standards. Suspected breaches of academic honesty will be investigated and charges shall be laid if reasonable and probable grounds exist. Students should review the York Academic Honesty policy for themselves at: http://www.yorku.ca/secretariat/policies/document.php?document=69. Students might also wish to review the interactive on-line Tutorial for students on academic integrity, at: https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/.

**Grading Scheme and Feedback Policy:** The grading scheme (i.e. kinds and weights of assignments, essays, exams, etc.) shall be announced, and be available in writing, within the first two weeks of class, and, under normal circumstances, graded feedback worth at least 15% of the final grade for Fall, Winter or Summer Term, and 30% for 'full year' courses offered in the Fall/Winter Term be received by students in all courses prior to the final withdrawal date from a course without receiving a grade, with the following exceptions: *Note: Under unusual and/or unforeseeable circumstances which disrupt the academic norm, instructors are expected to provide grading schemes and academic feedback in the spirit of these regulations, as soon as possible.* For more information on the Grading Scheme and Feedback Policy, please visit: http://www.yorku.ca/univsec/policies/document.php?document=86.

**In-Class Tests and Exams - the 20% Rule**: For all Undergraduate courses, except those which regularly meet on Friday evening or on a weekend, tests or exams worth more than 20% will not be held in the two weeks prior to the beginning of the official examination period. For further information on the 20% Rule, please visit: http://secretariat-policies.info.yorku.ca/policies/limits-on-the-worth-of-examinations-in-the-final-classes-of-a-term-policy/

**Reappraisals**: Students may, with sufficient academic grounds, request that a final grade in a course be reappraised (which may mean the review of specific pieces of tangible work). Non-academic grounds are not relevant for grade reappraisals; in such cases, students are advised to petition to their home Faculty. Students are normally expected to first contact the course director to discuss the grade received and to request that their tangible work be reviewed. Tangible work may include written, graphic, digitized, modeled, video recording or audio recording formats, but not oral work. Students need to be aware that a request for a grade reappraisal may result in the original grade being raised, lowered or confirmed. For reappraisal procedures and information, please visit the Office of the Registrar site at: http://myacademicrecord.students.yorku.ca/grade-reappraisal-policy.

**Accommodation Procedures:** LA&PS students who have experienced a misfortune or who are too ill to attend the final examination in an ADMS course should not attempt to do so; they must pursue deferred

standing. Other students should contact their home Faculty for information. For further information, please visit: http://ds.info.yorku.ca/academic-support-accomodations/

**Religious Accommodation**: York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. For more information on religious accommodation, please visit: https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs

**Academic Accommodation for Students with Disabilities (Senate Policy):** The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses. Provided that students have given sufficient notice about their accommodation needs, instructors shall take reasonable steps to accommodate these needs in a manner consistent with the guidelines established hereunder. For more information, please visit the Student Accessibility Services (formerly known as Counselling and Disability Services) website at https://accessibility.students.yorku.ca. York's disabilities offices and the Registrar's Office work in partnership to support alternate exam and test accommodation services for students with disabilities at the Keele campus. For more information on alternate exams and tests please visit http://www.yorku.ca/altexams/. Please alert the Course Director as soon as possible should you require special accommodations.