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# POLS 39003: ADVANCED QUANTITATIVE METHODS

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**Instructor Name:** Carly Potz-Nielsen

**Semester/Year:** Spring 2021

**Number of Credits:** 3 credits

**Class Location:** ONLINE

**Class Meeting Day(s) & Time(s):** LECTURE MWF 12:00 – 12:50PM CST

Synchronous sessions will take place during these times. The location of these sessions will be posted within the corresponding module on the course website.

**Office Hours:** Virtual office hours will be held via Zoom on Fridays, 8:00 – 10:00am and by appointment.

**Email:** c.potznielsen@tcu.edu

**Response Time:** Emails will be answered within 24 hours during the week (Monday – Thursday) and within 48 hours on the weekend (Friday – Sunday).

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## FINAL EXAM DATE & OTHER IMPORTANT DATES

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**Final Exam** The final period for this class is Monday, May 3<sup>rd</sup>, 11:00am – 1:30pm. During the exam period, students will present their full replication and extension project.

**Replication Project** For the midterm evaluation, students will replicate an existing research project and present their results to the class. For the final evaluation, students will extend upon their replication culminating in a final presentation to the class as well as a 8-10 page research paper, due May 7<sup>th</sup>. *Note: Graduating Seniors may have to arrange for alternative deadlines!*

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## COURSE DESCRIPTION

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We use quantitative methods in political science to try to make sense of the social world using data. One of the primary tools we use to identify relationships within our data is linear regression. However, it is often the case that the assumptions that underlie this modelling approach are not appropriate for real world data. This means that the conclusions we draw from these models about the way that people, interest groups, and governments interact can be seriously flawed. The goal of this course is to give students the tools to identify when these assumptions are violated, what it means for the conclusions of the model, and alternative modeling techniques to use to understand the relationship within the data. Students should also be far better equipped to read and understand a much broader range of applied quantitative political science research, including research applying statistical methods that fall beyond the direct scope of this course.

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## LEARNING OUTCOMES

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- **Major learning outcomes** Topics include political science methods applied to various research problems such as political behavior, public policy analysis, and program evaluation.

- **Course Learning Outcomes**

1. Awareness of extensions and alternative models to OLS regression
2. Ability to diagnose common issues with statistical models
3. Practice applying different models
4. Communicate statistical results
5. Adjust and qualify conclusions of statistical models
6. Assess the context and appropriateness of models

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## PREREQUISITES / PROGRAM OR MAJOR CONNECTIONS

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**Prerequisites** POSC 20093 or consent of the instructor.

**Program/Major connections** This course can fill one of the general requirements for the BA and BS track in the political science major.

**TCU Core Curriculum Connections** Writing Emphasis - TCUEC

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## REQUIRED TEXTS / MATERIALS

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There is one required textbook for this course:

Li, Quan. "Using R for Data Analysis in Social Sciences: A research project-oriented approach." 2019. New York, NY: Oxford University Press.

Course readings not from this book will be posted on the website, either as pdf or as hyperlinks.

Additionally, students will be required to *download R and RStudio*, both which are available online for no additional cost. Students should make arrangements to have access throughout the semester to a computer and a drive to save their work, for example, a thumb drive, an online cloud drive, like Google or Dropbox, or a shared drive.

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## ADDITIONAL / SUPPLEMENTARY RESOURCES

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While not required, the following books may be useful references for the material covered in this class.

Gelman, Andrew and Jennifer Hill. 2006. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press.

Monogan, James E. III. 2015. *Political Analysis Using R*. Springer.

Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Sage Publications.

Moore, Will H. and Siegel, David A. 2013. *A Mathematics Course for Political and*

*Social Research*. Princeton University Press. Wheelan, Charles. *Naked Statistics: Stripped the Dread from the Data*. 2014. W. W. Norton & Company.

Ellenberg, Jordan. *How Not To Be Wrong: The Power of Mathematical Thinking*. 2015. Penguin Books.

## TEACHING PHILOSOPHY

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As a teacher, I enjoy sharing with students perspectives and tools to help them evaluate and interact with a world that is constantly bombarding them with differing facts and explanations. Within my courses, I provide the conceptual grounding for evaluating empirical patterns and the skills to effectively analyze and communicate conclusions. To meet this goal, I work to ensure that students understand that the course is an opportunity for them to learn, instead of another hoop they have to jump through to graduate. As students become more effective at communicating their arguments, perspectives, and conclusions they contribute to broader, more interesting understandings of political phenomena. In the first and last class of every course, I stress that students have a role in the creation and development of knowledge. By being thoughtful about how they share their expertise, they can impact the shape of the world around them.

## INSTRUCTIONAL METHODS

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Each week will contain three minimal points of course engagement.

### Lectures (synchronous)

Lecture sessions will review the course concepts via examples and activities. Lecture slides will also be available through the course website.

*Objective: Lectures provide the base knowledge on the content and its context within the course. They will be the primary means through which content is introduced and explained throughout the course.*

### Labs (synchronous)

Lab sessions will be held synchronously during the scheduled section time every Friday, or as marked on the class schedule. Before lab, students should review the R script to be used during lab. Lab sessions will be used to work through the exercises and answer student questions.

*Objective: Labs provide an opportunity to practice R code, which will be used in the replication project. They intentionally have a limited time frame to place constraints on the amount of time spent on the exercise. A successful student will have attempted each lab.*

### Class Discussions/Groups Activities (synchronous)

Group activity instructions will be posted in the corresponding module. Each group activity is accompanied by a questions to be submitted through the course website. The group activities are intended to provide points of reflection, interaction with other students, and benchmarks throughout the course.

*Objective: Activities allow students to experience applying course concepts to real world examples in order to make concepts less abstract. Groups provide for the possible division of labor as well as a way to make connections within the class and to interact with other students' perspectives and understandings of the material. A successful student will complete the group activities and note where they connect with the course material*

### Discussion Boards (asynchronous)

Students are required to engage on the course discussion boards, whether it is through a new post or by contributing to an existing conversation. Posts can be examples of interesting studies, good/bad data visualizations, new polls, or any example of quantitative data and analysis being used in the 'news.' This includes

posts on social media, stories on cable television, newspapers, and podcasts. Each post by the student should also include a brief summary and initial take on the piece. By the end of the semester, students should be contributing, on average, 1 time per week. Students can post as many times within a week as they want, but no more than 5 posts within a given week will count for credit.

*Objective: Discussion boards will be used to identify and evaluate data analysis in the wild, with the goal of developing students' ability to think critically about quantitative results they come across in their daily lives.*

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## COURSE POLICIES AND REQUIREMENTS

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### ASSIGNMENTS

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#### **Discussion Boards (150 pts)**

The discussion boards will be used to share and analyze data and data analysis found within our daily lives. By the end of the semester, students should be averaging a post a week. A post can be sharing a new example of data in the wild or can be contributing to an existing post. Original posts can be examples of data taken from social media, stories on cable television, newspapers, and podcasts. Both original posts and those replying to an existing discussion must contribute a substantive thought to count for credit. More information on the exact format will be provided in each discussion board. Students can post as many times within a week as they want, but no more than 5 posts within a given week will count for credit.

*Location on course website: Discussion topics will be posted in the Discussions sections of the Activities tab.*

*Outcomes: (5) Adjust and qualify conclusions of statistical models; (6) Assess the context and appropriateness of models*

#### **Class Participation (100 pts)**

Each class, there will be a group activity accompanied by a survey to be submitted through the course website. Class participation will be graded on a mix of the completion of these activities, participation in class discussion, attendance, and communication with the professor throughout the semester. Additionally, in the first week of the semester, there will be a Syllabus Quiz (10 points) covering the course policies and expectations detailed throughout the syllabus.

*Location on course website: Class activity surveys posted in corresponding Course Module. Syllabus Quiz posted as Announcement and in Introduction Module.*

*Outcomes: (1) Awareness of extensions and alternative models to OLS regression; (2) Awareness of extensions and alternative models to OLS regression; (6) Assess the context and appropriateness of models*

#### **Lab Participation (150 pts)**

R is only learnt through working through and breaking code. Successful R users must develop habits of precise, intentional, and annotated code. Therefore, each week lab will focus on introducing and working through R commands. Before each lab session, students should read through the lab script. Each lab will have a set of practice questions that will direct students to apply the code for themselves. Students are encouraged to work in groups, but should each submit their own lab assignments. If students work in groups, then all members of the group should be listed at the top of each homework assignment.

*Location on course website: Lab handouts and submission link posted in corresponding Course Module, as well as in the Activities tab.*

*Outcomes: (2) Awareness of extensions and alternative models to OLS regression; (3) Practice applying different models; (4) Communicate statistical results (6) Assess the context and appropriateness of models*

### **Problem Sets (4 at 50 pts each)**

There will be 4 problem sets throughout the semester. They will focus on linking the theoretical points from class to their application in a real research setting. Emphasis will be placed on format as well as content. Each problem set will be given out at least a week in advance of the due date.

Problem sets should be saved as .pdfs, with the file title including your last name, the class, and the homework assignment separated by an underscore, i.e. Potz-Nielsen\_POSC39003\_HW1. All R scripts should be copy+pasted on a separate page at the end of the problem set.

*Location on course website: Problem set and submission link posted in corresponding Course Module, as well as in the Activities tab.*

*Outcomes: (1) Awareness of extensions and alternative models to OLS regression; (2) Awareness of extensions and alternative models to OLS regression; (3) Practice applying different models; (6) Assess the context and appropriateness of models*

### **Midterm Presentation (100 pts)**

At the midpoint of the semester, students will give a presentation on their work replicating a study or paper. The papers and data will be provided. The presentation will focus on summarizing the study, presenting their replicated results, and highlighting possible ways that the study could be adjusted or extended to better suit the data. As part of the presentation, students will submit a brief (1 page) handout for the audience to review prior to the presentation. Part of the presentation grade will include peer feedback, which is expected to be addressed in the final paper.

*Location on course website: Resources and the submission link for the research presentation will be available in the Replication Project Module.*

*Outcomes: (2) Awareness of extensions and alternative models to OLS regression; (4) Communicate statistical results; (5) Adjust and qualify conclusions of statistical models; (6) Assess the context and appropriateness of models*

### **Final Presentation and Paper (300 pts)**

At the end of the semester, students will present on how they extended the analysis replicated in the first half of the semester. This presentation (100pts) will address what the students adjusted in the original analysis, why they adjusted it, and how their adjustments change the conclusions drawn by the original study. Feedback from the presentation should be incorporated in the final research paper. The final paper (200pts) should be 8-10 pages and cover both the replication of the study and the subsequent extensions.

*Location on course website: Resources and the submission link for the research presentation will be available in the Replication Project Module.*

Outcomes: (1) Awareness of extensions and alternative models to OLS regression; (2) Awareness of extensions and alternative models to OLS regression; (3) Practice applying different models; (4) Communicate statistical results; (5) Adjust and qualify conclusions of statistical models; (6) Assess the context and appropriateness of models

## GRADING

### FINAL GRADE ELEMENTS / GRADE BREAKDOWN:

Outcome(s)	Assignments, Exams/Quizzes, Presentations, etc.	Percentage	Points
2,4,5,6	Midterm Presentation – Replication	10%	100
1,2,3,4,5,6	Final Paper and Presentation - Extension	30%	300
1,2,3,6	Problem Sets (4 at 50 points each)	20%	200
2,3,4	Lab Participation	15%	150
5,6	Discussion Boards	15%	150
1,2,6	Class Participation	10%	100

### FINAL +/- GRADE SCALE:

Grade	Score	Grade	Score
A	93–100	C	73–76.99
A-	90–92.99	C-	70–72.99
B+	87–89.99	D+	67–69.99
B	83–86.99	D	63–66.99
B-	80–82.99	D-	60–62.99
C+	77–79.99	F	0–59.99

### OFFICE HOURS

Office hours will be held virtually through a Zoom meeting. The link for office hours can be found in the Introduction course module on the course website. If a student wishes to set up an appointment for office hours, they should give at least a 12 hour notice. Appointments will not be held on weekends (Friday 8pm – Monday 8am.)

### LATE WORK

There is a penalty of 5 points for each day an assignment is late. However, late penalties will be waived for assignments, no questions asked, if the student emails the instructor before the original deadline and organizes an alternative due date. Assignments 1-2 should be submitted by midterm presentation. Assignments 4 and 5 should be submitted by the final presentation. Late lab assignments will not be accepted. Extensions on research papers should be cleared with instructor one week before due date. Extensions on extensions are not allowed. *It is the student's responsibility to keep track of outstanding assignments.*

### WORKING IN GROUPS

Students are permitted to work in groups for both the problem sets and the final project. Students working in groups should clear their group with the professor 1 day prior to the original due date for the assignment. For the

final project, groups must be submitted 1 day prior to the Midterm Presentations. At that point, the students will be placed into a group for that assignment and will be graded as a group. The group should submit one assignment with all member names included. If a group member isn't specified before the 1-day deadline, they should submit their own, individual, *unique*, submission. For the problem sets, groups are limited to 4 members; for the final project groups are limited to 2 members.

## GRADING CONCERNS

Students should wait to ask questions about their grades until 24 hours has passed from when the assignment or exam was handed back. Disputes should be addressed one-on-one, outside of class, within two weeks of when the assignment or exam was handed back. Any disputes after that period need to be accompanied with a written memo of where and why the points should be earned.

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## PARTICIPATION / ENGAGEMENT (ATTENDANCE)

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Successful students will regularly ask questions and engage with the course material. It should be noted that engaging with the course material is not equivalent to merely attending synchronous session. Students can participate by attending office hours, using the chat during lecture sessions, contributing in class activities, discussing material with the instructor, emailing questions about the class, or contributing to discussion boards on the course website.

## CLASS NORMS & NETIQUETTE

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All members of the class are expected to follow rules of common courtesy in all email messages, discussions, and chats. If I deem any of them to be inappropriate or offensive, I will forward the message to the Chair of the department and appropriate action will be taken, not excluding expulsion from the course. The same rules apply online as they do in person. Be respectful of other students. Foul discourse will not be tolerated. Please take a moment and read the [basic information about netiquette](http://www.albion.com/netiquette/) (<http://www.albion.com/netiquette/>).

Participating in the virtual realm, including social media sites and shared-access sites sometimes used for educational collaborations, should be done with honor and integrity. Please [review TCU's guidelines on electronic communications](https://tcu.codes/policies/network-and-computing-policy/e-mail-electronic-communications-social-networks/) (email, text messages, social networks, etc.) from the Student Handbook. (<https://tcu.codes/policies/network-and-computing-policy/e-mail-electronic-communications-social-networks/>)

Course material is expected to remain within the course. This means that students should not record, screenshot, download, or edit course material for any use outside the course without the written permission of the instructor. Further, any material produced by other students, such as discussion posts, chat questions, group assignments, or research projects, should not be copied or edited for sharing without the student's written permission.

## TECHNOLOGY POLICIES

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Students are required to have access to a computer with internet connect for the use of the course site. In addition, **students will be required to download the free statistical software, R and RStudio**, for the lab sessions and for use in the final research project. As the primary form of the communication will be email and announcements through the course site, students are encouraged to set up push notifications for their email accounts and for the course site (<https://documentation.brightspace.com/EN/brightspace/requirements/all/pulse.htm>).

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## EMAIL

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Only the official TCU student email address will be used for all course notification. It is your responsibility to check your TCU email on a regular basis. Students are expected to have read and understood any information contained within class emails 48 hours after they are sent.

The professor will respond to all emails and chats within 24 hours during the week (Monday – Thursday) and within 48 hours during the weekend (Friday – Sunday). If a student does not receive a reply from the professor within these time frames, the student should follow up with the professor.

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## ZOOM

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The primary means of hosting class and office hours will be via Zoom. Links to Zoom sessions will be clearly posted with their passwords in the corresponding course module for the day, under Content -> Modules on the course website. Links to office hours can be found in the Introduction module and in the course announcements.

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## RECORDING OF CLASS SESSIONS

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There may be some live class sessions that are recorded for use by enrolled students, including those who are unable to attend live, throughout the semester. Students who participate with their camera engaged or utilize a profile image are consenting to have their video or image recorded. If you do not wish to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are consenting to have their voices recorded. If you do not wish to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. Further, if you anticipate that you will not consent to your video and/or audio participation being recorded, please contact the instructor immediately so the instructor may work with you to determine how to assess your class participation and assignments that may require collaboration during the class session.

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## COURSE MATERIALS

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TCU students are prohibited from sharing any portion of course materials (including videos, PowerPoint slides, assignments, or notes) with others, including on social media, without written permission by the course instructor. Accessing, copying, transporting (to another person or location), modifying, or destroying programs, records, or data belonging to TCU or another user without authorization, whether such data is in transit or storage, is prohibited. The full policy can be found at: <https://security.tcu.edu/polproc/usage-policy/>.

**Violating this policy is considered a violation of Section 3.2.15 of the Student Code of Conduct** (this policy may be found in the Student Handbook at <https://tcu.codes/code/index/>), **and may also constitute Academic Misconduct or Disruptive Classroom Behavior** (these policies may be found in the undergraduate catalog at <https://tcu.smartcatalogiq.com/current/Undergraduate-Catalog/Student-Policies/Academic-Conduct-Policy-Details>). TCU encourages student debate and discourse; accordingly, TCU generally interprets and applies its policies, including the policies referenced above, consistent with the values of free expression and First Amendment principles.

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## ACADEMIC MISCONDUCT

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- Academic Misconduct (Sec. 3.4 from the [TCU Code of Student Conduct](#)): Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life and are also listed in detail in the [Undergraduate Catalog](#) and the [Graduate Catalog](#) Specific examples include, but are not limited to:
- **Cheating:** Copying from another student's test paper, laboratory report, other report, or computer files and listings; using, during any academic exercise, material and/or devices not authorized by the person in charge of the test; collaborating with or seeking aid from another student during a test or laboratory without permission; knowingly using, buying, selling, stealing, transporting, or soliciting in its entirety or in part, the contents of a test or other assignment unauthorized for release; substituting for another student or permitting another student to substitute for oneself.
- **Plagiarism:** The appropriation, theft, purchase or obtaining by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit. Appropriation includes the quoting or paraphrasing of another's work without giving credit therefore. If concerns arise the instructor will use the online service of TurnItIn via TCU Online/D2L to check for plagiarism in student submissions.
- **Collusion:** The unauthorized collaboration with another in preparing work offered for credit.
- **Abuse of resource materials:** Mutilating, destroying, concealing, or stealing such material.
- **Computer misuse:** Unauthorized or illegal use of computer software or hardware through the TCU Computer Center or through any programs, terminals, or freestanding computers owned, leased or operated by TCU or any of its academic units for the purpose of affecting the academic standing of a student.
- **Fabrication and falsification:** Unauthorized alteration or invention of any information or citation in an academic exercise. Falsification involves altering information for use in any academic exercise. Fabrication involves inventing or counterfeiting information for use in any academic exercise.
- **Multiple submission:** The submission by the same individual of substantial portions of the same academic work (including oral reports) for credit more than once in the same or another class without authorization.
- **Complicity in academic misconduct:** Helping another to commit an act of academic misconduct.
- **Bearing false witness:** Knowingly and falsely accusing another student of academic misconduct.

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## TCU ONLINE: OUR LEARNING MANAGEMENT SYSTEM

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### GETTING STARTED WITH TCU ONLINE

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**Technical Requirements:** Check your computer is ready by looking at the [specifications list](#). (<https://community.brightspace.com/s/article/Brightspace-Platform-Requirements>)

**Log In:** (using your TCU Network Credentials)

1. Access via [my.tcu.edu](http://my.tcu.edu) > Student Quick Links > TCU Online
2. Login at the following [website](http://d2l.tcu.edu) (<http://d2l.tcu.edu>) my.tcu.edu

\*For information about logging into TCU Online, view these [instructions](http://tcuonline.tcu.edu/kb/how-do-i-log-in/). (<http://tcuonline.tcu.edu/kb/how-do-i-log-in/>).

**Student Orientation Tutorial for TCU Online:** If you have not yet taken the TCU Online Student Orientation Tutorial, please do so now. To access it, click on the Orientations semester OR view all courses in your My Courses widget visible upon logging in to TCU Online. Click on the "Student Orientation Tutorial" to enter the orientation course. Follow the instructions in the course. You can return to this tutorial at any time.

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## HOW THIS COURSE WILL USE TCU ONLINE

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The course website will be the primary point of interaction for this course. Lectures, lecture notes, and group assignments for each class will be posted under the Content tab. Grades and feedback for assignments, exams, activities, and the final project will be posted under the Assessment tab. Assignments, discussions, quizzes, and exams are posted under the Activities tab and should be submitted through the website. Students should make use of the course calendar to keep up with due dates and synchronous sessions.

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## GETTING HELP WITH TCU ONLINE

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If you experience any technical problems while using TCU Online, please do not hesitate to contact the TCU Online (D2L) Help Desk. They can be reached by phone or chat 24 hours a day, 7 days a week, 365 days a year.

**Phone: 1-877-325-7778**

**Chat:** Chat is available within TCU Online in the Help menu on the navigation bar.

*IF YOU ARE WORKING WITH THE HELP DESK TO RESOLVE A TECHNICAL ISSUE, MAKE SURE TO KEEP ME UPDATED ON THE TROUBLESHOOTING PROGRESS.*

If you have a course-related issue (course content, assignment troubles, quiz difficulties) please contact me.

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## PERSONAL SETTINGS & NOTIFICATIONS FOR TCU ONLINE

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As a student, you should set up your account settings, profile, and notifications. To do this you will login to TCU Online and select your name on the top right of the screen. In the Profile area, you can upload a photo of yourself and add personal information. In the Notifications area, you can add your phone number to receive text messages when grades are given as well as reminder texts for upcoming assignments and quizzes.

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## STUDENT SUCCESS TOOLS FOR TCU ONLINE

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### PULSE

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Pulse is a phone app which gives you access to the course calendar, assignments, grades, and announcements. This app provides a graph that can help you manage your time. Based on the number of assignments and events on the course calendar for your classes, the graph will display busy times for class work in the upcoming week. You can use this app to manage your daily workload, and it includes the ability to view and access course materials offline. You can download Pulse from the Google Play or Apple Store. You can learn more and download Pulse here: <https://www.d2l.com/products/pulse/>.

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### READSPEAKER

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[ReadSpeaker](#) includes a number of tools that can enhance your understanding and comprehension of course materials. ReadSpeaker can create an audio version of content that you can listen to while on a page within a course or that you can download to listen offline. ReadSpeaker can also read Microsoft Office files and PDFs. There are additional tools and features to assist you with reading and focusing in TCU Online, tools that provide support for writing and proofing text, and tools that can read non-TCU Online content aloud. You can learn more about how to use ReadSpeaker tools here: <https://tcuonline.tcu.edu/how-to-hub/instructor-how-to-hub-for-tcu-online/integrations-and-mobile/readspeaker/>

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## SUPPORT FOR TCU STUDENTS

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### CAMPUS LIFE AND THE STUDENT EXPERIENCE WILL BE DIFFERENT THIS YEAR

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The health and safety of students, faculty, and staff is Texas Christian University's highest priority. TCU has implemented public health interventions, which includes following local and state public health orders and CDC guidelines. These health interventions may impact your experience as a student both inside and outside the classroom. Safety protocols may change during the semester and may result in modifications or changes to the teaching format, delivery method, or the course schedule (e.g., altering meeting times or frequency; changing beginning or ending dates for a term; or partially or completely moving from a face-to-face classroom teaching to an online teaching or remote learning format). Any changes in teaching format, delivery method, or course schedule will not impact the credit hours for the course.

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### HEALTH AND WELLNESS

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If you are exhibiting symptoms that may be related to COVID-19 (fever or chills, dry cough, shortness of breath, etc.) or are concerned that you may have been exposed to COVID-19, you must self-quarantine and consult with the Brown Lupton Health Center at 817-257-7949 for further guidance.

In addition, you must notify the Campus Life Office immediately at 817-257-7926 or use the TCU COVID-19 Self-Report Hotline, 817-257-2684 (817-257-COVI). Campus Life will inform your professors that you are unable to attend class, and provide any assistance and support needed. Click here for detailed information concerning COVID-19 symptoms: <https://www.cdc.gov/coronavirus>.

If you are unwell, but are not exhibiting potential COVID-19-related symptoms, please notify your instructor as soon as possible that you are ill and will not be attending class.

If you do not feel well enough to attend class in person, but feel well enough to attend class remotely, please notify your instructor as soon as possible before the class begins to arrange attendance via video conferencing.

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### FACE COVERINGS AND PHYSICAL DISTANCING

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Face coverings are required on campus, unless you are alone in your private office or dorm room. Students are expected to practice physical distancing and wear protective face coverings at all times while in public spaces on the TCU campus. Failing to do so in the classroom could result in the student being asked to leave the room and continue the class through remote access. Additionally, the instructor has the option to terminate the class period and continue it as a remote session. Failure to comply with the instructor's request to adhere to TCU policy regarding face coverings or repeat violations may be reported to Campus Life.

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## STUDENT ACCESS AND ACCOMMODATION

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Texas Christian University affords students with disabilities reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. To be eligible for disability-related academic accommodations, students are required to register with the TCU Office of Student Access and Accommodation and have their requested accommodations evaluated. Students are required to provide instructors an official TCU notification of accommodation approved through Student Access and Accommodation. More information on how to apply for accommodations can be found at <https://www.tcu.edu/access-accommodation/> or by calling Student Access and Accommodation at (817) 257-6567. Accommodations are not retroactive and require advance notice to implement.

Audio recordings of class lectures are permitted for students as an approved disability accommodation through Student Access and Accommodation. Recordings are not to be shared with other students, posted to any online forum, or otherwise disseminated. By participating in this course, you are giving your implied consent to this recording. If you anticipate that you will not consent to your audio participation being recorded, please contact the instructor immediately so the instructor may work with you to determine how to assess your class participation and assignments that may require collaboration during the class session.

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## TCU POLICY FOR RELIGIOUS OBSERVATIONS & HOLIDAYS

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“Students who are unable to participate in a class, in any related assignment or in a university required activity because of the religious observance of a holy day shall be provided with a reasonable opportunity to make up the examination or assignment, without penalty, provided that it does not create an unreasonable burden on the University.” For more information, please visit the [TCU Policy for Religious Observations & Holidays](#) webpage.

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## Campus Offices

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- Alcohol & Drug Education Center (817-257-7100, Samuelson Hall basement)
- Brown-Lupton Health Center (817-257-7938 or 817-257-7940)
- Campus Life (817-257-7926, Sadler Hall 2006)
- Center for Academic Services (817-257-7486, Sadler Hall 1022)
- Center for Digital Expression (CDeX) (cdex@tcu.edu, Scharbauer 2003)
- Counseling & Mental Health Center (817-257-7863, Samuelson Hall basement)
- Mary Coats Burnett Library (817-257-7117)
- Office of Religious & Spiritual Life (817-257-7830, Jarvis Hall 1<sup>st</sup> floor)
- Student Development Services (817-257-7855, BLUU 2003)
- Center for Writing (817-257-7221, Reed Hall 419)
- Transfer Student Center (817-257-7855, BLUU 2003)
- Veterans Services (817-257-5557, Jarvis Hall 219)

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## ANTI-DISCRIMINATION AND TITLE IX INFORMATION

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### STATEMENT ON TCU’S DISCRIMINATION POLICY

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TCU prohibits discrimination and harassment based on age, race, color, religion, sex, sexual orientation, gender, gender identity, gender expression, national origin, ethnic origin, disability, predisposing genetic information, covered veteran status, and any other basis protected by law, except as permitted by law. TCU also prohibits unlawful sexual and gender-based harassment and violence, sexual assault, incest, statutory rape, sexual exploitation, intimate partner violence, bullying, stalking, and retaliation. We understand that discrimination, harassment, and sexual violence can undermine students' academic success and we encourage students who have experienced any of these issues to talk to someone about their experience, so they can get the support they need.

- [Review TCU's Policy on Prohibited Discrimination, Harassment and Related Conduct or to file a complaint:](https://titleix.tcu.edu/title-ix/)
- [Learn about the Campus Community Response Team and Report a Bias Incident:](https://titleix.tcu.edu/campus-community-response-team/)

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### STATEMENT ON TITLE IX AT TCU

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As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep any information you share private to the greatest extent possible. However, I have a mandatory reporting responsibility under TCU policy and federal law and I am required to share any information I receive regarding sexual harassment, discrimination, and related conduct with TCU's Title IX Coordinator. Students can receive confidential support and academic advocacy by contacting [TCU's Confidential Advocate in the Campus Advocacy, Resources & Education office](https://care.tcu.edu/) at <https://care.tcu.edu/> or by calling (817) 257-5225 or the [Counseling & Mental Health Center](https://counseling.tcu.edu/) at <https://counseling.tcu.edu/> or by calling (817) 257-7863. [Alleged violations can be reported to the Title IX Office](https://titleix.tcu.edu/student-toolkit/) at <https://titleix.tcu.edu/student-toolkit/> or by calling (817) 257-8228. Should you wish to make a confidential report, the Title IX Office will seek to maintain your privacy to the greatest extent possible, but cannot guarantee confidentiality. Reports to law enforcement can be made to the Fort Worth Police Department at 911 for an emergency and (817) 335-4222 for non-emergency or TCU Police at (817) 257-7777.

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### OBLIGATIONS TO REPORT CONDUCT RAISING TITLE IX OR VAWA ISSUES

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**Mandatory Reporters: All TCU employees, except Confidential Resources, are considered Mandatory Reporters for purposes of their obligations to report, to the Coordinator, conduct that raises Title IX and/or VAWA (Violence Against Women Act) issues.**

Mandatory Reporters are required to immediately report to the Coordinator information about conduct that raises Title IX and/or VAWA issues, including any reports, complaints or allegations of sexual harassment, discrimination and those forms of prohibited conduct that relate to nonconsensual sexual intercourse or contact, sexual exploitation, intimate partner violence, stalking and retaliation involving any member of the TCU community, except as otherwise provided within the [Policy on Prohibited Discrimination, Harassment and Related Conduct](#).

Mandatory Reporters may receive this information in a number of ways. For example, a complainant may report the information directly to a Mandatory Reporter, a witness or third-party may provide information to a Mandatory Reporter, or a Mandatory Reporter may personally witness such conduct. A Mandatory Reporter's obligation to report such information to the Coordinator does not depend on how he/she received the

information. Mandatory Reporters must provide all known information about conduct that raises Title IX or VAWA issues to the Coordinator, including the identities of the parties, the date, time and location, and any other details. Failure of a Mandatory Reporters to provide such information to the Coordinator in a timely manner may subject the employee to appropriate discipline, including removal from a position or termination of employment.

Mandatory Reporters cannot promise to refrain from forwarding the information to the Coordinator if it raises Title IX or VAWA issues or withhold information about such conduct from the Coordinator. Mandatory Reporters may provide support and assistance to a complainant, witness, or respondent, but they should not conduct any investigation or notify the respondent unless requested to do so by the Coordinator.

Mandatory Reporters are not required to report information disclosed (1) at public awareness events (e.g., "Take Back the Night," candlelight vigils, protests, "survivor speak-outs," or other public forums in which students may disclose such information (collectively, public awareness events); or (2) during an individual's participation as a subject in an Institutional Review Board approved human subjects research protocol (IRB Research). TCU may provide information about Title IX rights and available resources and support at public awareness events, however, and Institutional Review Boards may, in appropriate cases, require researchers to provide such information to all subjects of IRB Research.

Relevant reporting phone numbers are: 911 for an emergency and (817) 335-4222 for non-emergency or TCU Police at (817) 257-7777.

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### Statement of Disability Services at TCU

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Disabilities Statement: Texas Christian University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. Eligible students seeking accommodations should contact the [Coordinator of Student Disabilities Services in the Center for Academic Services](#) located in Sadler Hall, room 1010 or [http://www.acs.tcu.edu/disability\\_services.asp](http://www.acs.tcu.edu/disability_services.asp).

Adequate time must be allowed to arrange accommodations and accommodations are not retroactive; therefore, students should contact the Coordinator as soon as possible in the academic term for which they are seeking accommodations.

Further information can be obtained from the Center for Academic Services, TCU Box 297710, Fort Worth, TX 76129, or at (817) 257-6567.

*Each eligible student is responsible for presenting relevant, verifiable, professional documentation and/or assessment reports to the Coordinator. [Guidelines for documentation](#) may be found at [http://www.acs.tcu.edu/disability\\_documentation.asp](http://www.acs.tcu.edu/disability_documentation.asp).*

Students with emergency medical information or needing special arrangements in case a building must be evacuated should discuss this information with their instructor/professor as soon as possible.

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### EMERGENCY RESPONSE INFORMATION

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Please review [TCU's L.E.S.S. is More public safety video](#) to learn about Lockdown, Evacuate, and Seek Shelter procedures. (<https://publicsafety.tcu.edu/less-is-more/>)

[TCU's Public Safety website](https://publicsafety.tcu.edu/) provides maps that show our building's rally point for evacuation and the seek shelter location. (<https://publicsafety.tcu.edu/>)

In the event of an emergency, call the TCU Police Department at **817-257-7777**.

Download the [Frogshield Campus Safety App](https://police.tcu.edu/frogshield/) on your phone. (<https://police.tcu.edu/frogshield/>)

## COURSE SCHEDULE

This calendar represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunities. Such changes will be clearly communicated.

Date and Topic	Preparation / Reading Assignment (Other than the course text, all material is located in the corresponding module on the course site.)
<b>Module 1: Data and Regression Analysis</b>	
1/20 Course Plan and Research Design	<b>Preparation / Reading Assignment</b> > Kevin Drum “Social Science is Hard” Mother Jones <a href="http://www.motherjones.com/kevin-drum/2012/07/social-science-hard">http://www.motherjones.com/kevin-drum/2012/07/social-science-hard</a> > King, “Replication, Replication”(p444-445) > SSR Chapter 1-2 ( <i>skim for review</i> )
1/22 LAB: Introducing R	<b>Preparation / Reading Assignment</b> Lab Script: Introducing R
1/25 Data Structure	<b>Preparation / Reading Assignment</b> > Monogan, Chapters 1-4. > Li, Chapters 1-2
1/27 Linear Regression	<b>Preparation / Reading Assignment</b> > Monogan, Chapter 6 > Kellstedt and Whitten, Sections 10.1-10.4, 11.1-11.2
1/29 LAB: Regression	<b>Preparation / Reading Assignment</b> Lab Script: Regression
2/1 Interpreting Linear Regression	<b>Preparation / Reading Assignment</b> > Kellstedt and Whitten, Sections 10.5-10.10 > Li, Chapter 5
2/3 Assumptions of Regression: Minimal Mathematical Requirements and Bias	<b>Preparation / Reading Assignment</b> > Kellstedt and Whitten, Chapter 12 > Li, Chapter 6 (p206 – 220)
2/5 Assumptions of Regression II: Efficiency	<b>Preparation / Reading Assignment</b> > Li, Chapter 6 (p221 – 239)
2/8 LAB: Evaluating Regression	<b>Preparation / Reading Assignment</b> Lab Script: Evaluating Regression

## Module 2: Minimal Mathematical Assumptions

2/10  
Evaluating Data: the case of missingness and non-random samples

**Preparation / Reading Assignment**  
> Westreich, Daniel “Berkson's Bias, Selection Bias, and Missing Data”  
> Raghunathan, Trivellore E “What Do We Do with Missing Data? Some Options for Analysis of Incomplete Data”

### Problem Set 1 Due, 2/12 11:59pm CST

2/12  
Evaluating Data: Outliers

**Preparation / Reading Assignment**  
> Li, Chapter 6 (p240 – 245)

2/15  
LAB: Evaluating Data

**Preparation / Reading Assignment**  
Lab Script: Evaluating Data

2/17  
Interpreting Probability

**Preparation / Reading Assignment**  
> Ellenberg, Jordan. Chapter 3 in How Not to Be Wrong: The Power of Mathematical Thinking. Penguin Books. 2014.  
> Gelman and Hill, Chapter 5 and Section 6.4

2/19  
Categorical Dependent Variables: Binary

**Preparation / Reading Assignment**  
> Monogan, Section 7.1.

2/22  
LAB: Logit/Probit Models

**Preparation / Reading Assignment**  
Lab Script: Logit/Probit Models

2/24  
Categorical Dependent Variables: Multinomial

**Preparation / Reading Assignment**  
> Gelman and Hill, Section 6.5

### Problem Set 2 Due, 2/26 11:59pm CST

2/26  
Categorical Dependent Variables: Ordinal

**Preparation / Reading Assignment**  
> Gelman and Hill, Section 6.5 (reread)  
> Monogan, Section 7.2.

3/1  
LAB: Multinomial and Ordinal Logits

**Preparation / Reading Assignment**  
Lab Script: Multinomial and Ordinal Logits

3/3  
Review Labs and Models; Replication Workshop

**Preparation / Reading Assignment**  
Review Lab Scripts

3/5  
Presenting Results

**Preparation / Reading Assignment**  
> Presentation of Regression Results  
<https://www.csus.edu/indiv/v/vangaasbeckk/courses/145/sup/regressionresults.pdf>

3/8 Project Workshop	<p>&gt; King, Gary, Michael Tomz, and Jason Wittenberg. 2000. Making the Most of Statistical Analyses: Improving Interpretation and Presentation. American Journal of Political Science. 44(2): 341-355.</p> <p>&gt; Li, Chapter 6 (p247 – 260)</p> <p><b>Preparation / Reading Assignment</b> Replication Paper</p>
3/10	Class Recess – NO CLASS
3/12 Project Workshop	<p><b>Preparation / Reading Assignment</b> Chosen Replication Paper</p>
<b>3/15 Midterm Presentations, Group 1</b>	
<b>3/17 Midterm Presentations, Group 2</b>	
<b>Module 3: Assumptions of Non-Bias</b>	
3/19 Identifying and Diagnosing Bias in Samples	<p><b>Preparation / Reading Assignment</b> &gt; “Bias in Statistics: Definition, Selection Bias &amp; Survivorship Bias” <a href="https://www.statisticshowto.com/what-is-bias/">https://www.statisticshowto.com/what-is-bias/</a></p>
3/22 Bias over Space and Time	<p><b>Preparation / Reading Assignment</b> &gt; Clark, Tom S. and Drew A. Linzer. “Should I Use Fixed or Random Effects?”, Political Science Research and Methods (2015), 399-408. &gt; Monogan, Section 8.1.</p>
3/24 LAB: Fixed and Random Effects	<p><b>Preparation / Reading Assignment</b> Lab Script: Fixed and Random Effects</p>
3/26 Conditional Theories: Mediators/Moderators	<p><b>Preparation / Reading Assignment</b> &gt; MacKinnon, David P. “Integrating Mediators and Moderators in Research Design”</p>
3/29 Multi-level Models	<p><b>Preparation / Reading Assignment</b> &gt; Brambor, Thomas, William Roberts Clark, and Matt Golder. “Understanding Interaction Models: Improving Empirical Analyses”. Political Analysis (2006). &gt; Gelman and Hill, Section 3.3</p>
3/31 LAB: Interactions Terms and Multilevel Models	<p><b>Preparation / Reading Assignment</b> Lab Script: Interaction Terms</p>
4/2	Good Friday – NO CLASS
4/5 Endogeneity in Regression	<p><b>Preparation / Reading Assignment</b> &gt; Kerner, Andrew. “Why Should I Believe You? The Costs and Consequences of Bilateral Investment Treaties,” International Studies Quarterly (2009), 73-82. &gt; Sajjad, Bassalat. “Instrumental Variables in R exercises (Part-1)” <a href="https://www.r-bloggers.com/instrumental-variables-in-r-exercises-part-1/">https://www.r-bloggers.com/instrumental-variables-in-r-exercises-part-1/</a>.</p>

Sections 10.5 and 10.6 in Gelman and Hill.

**Problem Set 3 Due, 4/7 11:59pm CST**

4/7  
Lab: Two-stage Regressions      **Preparation / Reading Assignment**  
Lab Script: Two-stage Regressions

**Module 4: Efficiency**

4/9  
Heteroskedasticity and Robust  
Standard Errors      **Preparation / Reading Assignment**  
> Gujarati and Porter, Chapter 10  
> Li, Chapter 6 (p221 – 223) (reread)

4/12  
Multicollinearity      **Preparation / Reading Assignment**  
> Gujarati and Porter, Chpt 11  
> Li, Chapter 6 (p223 – 239) (reread)

4/14  
LAB: Reducing Standard Errors      **Preparation / Reading Assignment**  
Lab Script: Reducing Standard Errors

4/16  
Model Fit: Regression      **Preparation / Reading Assignment**  
> Karen Grace –Martin “Assessing the Fit of Regression Models” *The Analysis  
Factor*  
<https://www.theanalysisfactor.com/assessing-the-fit-of-regression-models/>

4/19  
Model Fit: MLE      **Preparation / Reading Assignment**  
> “Bagheri, Reza, “ROC Curve, a Complete Introduction”  
[https://towardsdatascience.com/roc-curve-a-complete-introduction-  
2f2da2e0434c](https://towardsdatascience.com/roc-curve-a-complete-introduction-2f2da2e0434c)

4/21  
LAB: Model Fit      **Preparation / Reading Assignment**  
Lab Script: Model Fit

**Problem Set 4 Due, 4/23 11:59pm CST**

4/23  
Adjusting Conclusions      **Preparation / Reading Assignment**  
> Schrod, Phillip A. “7 Deadly Sins of Contemporary Quantitative Analysis.”

4/26  
Presenting Results      **Preparation / Reading Assignment**  
Presenting Results Primer

4/28  
LAB: Reviewing R Code      **Preparation / Reading Assignment**  
Class Script

4/30  
Workshop + SPOT Evaluations      **Preparation / Reading Assignment**  
Workshop

**Final Presentations May 3<sup>rd</sup>, 11:00 – 1:30PM CST**

**Final Paper May 7th, 11:59 PM CST**

## STUDENT PERCEPTION OF TEACHING (SPOT)

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Towards the end of the term you will receive an email asking to complete your SPOT for this course. I appreciate your thoughtful and reflective feedback to help make this course successful for future students. You can fill out the SPOT by clicking on the link in the email or in TCU Online when SPOTs open. The SPOT is the formal survey for this course and is used to make adjustments for future semesters.

In addition, there will be two informal midterm course surveys, administered by the instructor to gather information regarding the pacing, procedures, material, and workload of the course. Feedback on these surveys will be used to adapt the course within the current semester.

## TCU MISSION STATEMENT

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To educate individuals to think and act as ethical leaders and responsible citizens in the global community.