Data Analytics 1
ADTA 5130 Section 100
IPAC 4130 Section 100
100% online, January 17 – March 8, 2023

Instructor Contact
Name: John Schroeder
Office Location: Virtual office
Office Hours: By appointment via email
Email: john.schroeder@unt.edu

About the Professor / Instructor
Welcome to ADTA 5130/IPAC 4130 Data Analytics 1. I am John Schroeder, the instructor for this course and an Adjunct Faculty member of the Advanced Data Analytics department. I work full-time as a data scientist for Lockheed Martin Aeronautics in Fort Worth. Prior to Lockheed Martin, I was an operations research analyst in the United States Air Force for 20 years. I have a Masters in Applied Mathematics from the University of Nebraska and a Bachelors in Mathematics from the United States Air Force Academy.

I am excited to get to know each of you as we explore a variety of statistical analysis tools, choose appropriate methods, interpret the output, and make decisions to achieve the desired outcome.

Communication Expectations: The preferred way to contact me is via email (not the Canvas email tool). I do not have a campus office, but I am happy to chat with you on a virtual meeting. Emails will be answered as quickly as possible, usually in one business day or less. Fridays work best for me, but I understand that waiting for Friday is not always possible. If I have not responded within one business day, please resend your message as student emails occasionally are routed to the junk folder. Please visit our Online Communication Tips (https://clear.unt.edu/online-communication-tips) for general guidelines to assist you in your online communications.

Welcome to UNT!
As members of the UNT community, we have all made a commitment to be part of an institution that respects and values the identities of the students and employees with whom we interact. UNT does not tolerate identity-based discrimination, harassment, and retaliation. UNT’s full Non-Discrimination Policy can be found in the UNT Policies section of the syllabus.
Required Materials

One textbook is required for this course. See the Course Introduction module in CANVAS for ordering your online textbook and connecting the material to CANVAS. Other supplemental materials will be provided via a link to the UNT Willis Library website or included in the Module folders on Canvas. Students will also need to have access to Microsoft Excel for data analysis assignments.

By Sanjiv Jaggia and Alison Kelly
ISBN13: 9781260716306
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Optional resource (useful after the course when you no longer have the textbook)

This is a suggested book, not required. Some students will find that this book provides easy to understand explanations of some of the concepts presented in the course with additional examples in Excel.


Course Description

This course provides an overview of quantitative methods essential for analyzing data, with hands-on application that focuses on business/industry applications designed to understand the relationships among variables and help solve problems. Topics include the exploratory data analysis framework, descriptive statistics, data visualization, basic probability models needed for statistical analysis, sampling methods and distributions, parameter estimation, interval estimation, hypothesis testing, Chi-Square tests, analysis of variance (ANOVA) and linear regression models. Standard and open-source statistical packages will be used to apply techniques to real-world problems.

Course Structure

This is an 8-week 100% online course. I will schedule a virtual class meeting each week using Zoom in Canvas, typically Tuesday evenings from 7:30-9:00. Participation in the weekly meeting is optional but you are encouraged to attend. All virtual class meetings will be recorded and made available to the class. Additionally, the course has prerecorded lessons if students want to work at their own pace.
Course Objectives
By the end of the course, students should be able to:

1. Understand and apply fundamental exploratory data analysis methods.
2. Identify and calculate appropriate descriptive statistics for different data types and data distributions.
3. Create and interpret appropriate basic data visualizations.
4. Introduce, explain, and apply basic probability models used in statistical analysis.
5. Explain normal distribution and other types of probability distributions.
6. Describe sampling methodologies and distributions of sample means.
7. Calculate sampling distributions for proportions.
8. Calculate, explain, and interpret confidence intervals.
9. Perform hypothesis tests for one and two samples.
10. Conduct and interpret Chi-Square tests.
11. Know the type of data required to do the statistical procedures in this course
12. Construct an appropriate statistical model in order to answer important business-related questions
13. Evaluate the validity of a statistical model when applied to a particular dataset
14. Develop and articulate results from the linear regression model
15. Apply statistical software tools to perform data analysis projects
16. Communicate the results of a data science analysis to a non-technical audience.

Course Topics
1. Review of fundamentals of exploratory data analysis
2. Data visualization
3. Review of probability models
4. Application of probability models to parameter estimation
5. Testing hypotheses
6. Statistical Inference
7. Chi-square tests
8. ANOVA
9. Simple and multiple linear regression

Teaching Philosophy
It is my goal to help you master the curriculum so you can then apply that knowledge to your future personal and professional analytics endeavors. I hope to create a learning environment in which students feel respected, are engaged in the activities, and share their questions, experiences, and ideas with me and the other students. I expect each student to work at their full capacity, respect others, and participate so that their experiences can add to the overall learning experience.

Course Technology & Skills
Student Academic Support Services

Links to all these services can be found on the Online Student Resources tab within the CanvasHelp function.
The following information is provided to assist you in preparation for the technological aspect of the course.

- **UIT Help Desk:** [http://it.unt.edu/help-desk-resources-students](http://it.unt.edu/help-desk-resources-students)

- **Browser requirements:** You need a browser that interfaces well with Canvas, such as Microsoft Edge, Google Chrome, or Mozilla Firefox. [https://clear.unt.edu/supported-technologies/canvas/requirements](https://clear.unt.edu/supported-technologies/canvas/requirements)

- **Word Processor:** Creating and submitting files in Microsoft Office, the standard software for this course.

**Canvas Technical Requirements / Assistance**

**Access and Log in Information**

This course was developed and will be facilitated utilizing the CANVAS Learning Management System. CANVAS opens on the first day of the 8-week period. To get started with the course, please go to: [https://unt.instructure.com/login/ldap](https://unt.instructure.com/login/ldap)

You can access student guides on Canvas at this site. You will need your EUID and password to log in to the course. If you do not know your EUID or have forgotten your password, please go to: [https://ams.unt.edu/](https://ams.unt.edu/)

The Canvas Student app has a mobile version of Canvas that helps students stay current with their courses anywhere. Download the Canvas Student app on Android and iOS devices.
For iOS devices, see:
How do I download the Canvas Student app on my iOS device?
https://community.canvaslms.com/docs/DOC-9831-18561185379

For Android devices, see: How do I download the Canvas Student app on my Android device?
https://community.canvaslms.com/docs/DOC-9758-18555199445

Minimum Technology Requirements
To be successful in this course, you will need the following:

- Computer
- Reliable internet access
- Speakers/microphone/camera
- Microsoft Office Suite with current version of Excel
- Statistical Software (SAS/R/Python – Optional)
- Canvas Technical Requirements
  (https://clear.unt.edu/supportedtechnologies/canvas/requirements)

Computer Skills & Digital Literacy
This course utilizes Excel (or SAS/R/Python) to perform analytics techniques with curriculum delivered on our Canvas learning management system platform. You should be able to successfully:

- Use Canvas including uploading and downloading files and posting to discussion boards
- Send email with attachments
- Download and install software
- Use spreadsheet programs
- Use presentation and graphics programs

Technical Assistance
Part of working in the online environment involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk: UIT Student Help Desk site (http://www.unt.edu/helpdesk/index.htm)
Email: helpdesk@unt.edu Phone: 940-565-2324
In Person: Sage Hall, Room 130
Walk-In Availability: 8am-9pm
Telephone Availability:
  - Sunday: noon-midnight
  - Monday-Thursday: 8am-midnight
  - Friday: 8am-8pm
  - Saturday: 9am-5pm
Laptop Checkout: 8am-7pm

For additional support, visit Canvas Technical Help
Netiquette

Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. This includes but is not limited to comments made on discussion boards or other unacceptable communications between students in an online or blended learning environment. Inappropriate behaviors will be handled based upon the UNT Student Conduct and Discipline Policy which can be found at deanofstudents.unt.edu/conduct.

For those students that are new to online learning or assignments on a Learning Management System like Canvas, you may find these guidelines developed by Albion and Seth T. Ross to be very helpful.


Course Requirements

Your final grade will be determined based on weekly assignments, projects, and class participation according to the table below. The total number of points received will be divided by the total possible number of points.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Points Possible</th>
<th>Percentage of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation: 4 discussion board assignments @ 30 points each</td>
<td>120 points</td>
<td>12%</td>
</tr>
<tr>
<td>Quizzes: 6 weekly quizzes @ 20 points each</td>
<td>120 points</td>
<td>12%</td>
</tr>
<tr>
<td>Labs: 6 weekly homework assignments @ 70 points each</td>
<td>420 points</td>
<td>42%</td>
</tr>
<tr>
<td>Mid-Term Project @ 100 points</td>
<td>100 points</td>
<td>10%</td>
</tr>
<tr>
<td>Final Analysis Project @ 240 points</td>
<td>240 points</td>
<td>24%</td>
</tr>
<tr>
<td>Total Points Possible</td>
<td>1000 points</td>
<td>100%</td>
</tr>
</tbody>
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Grading

Course grades will be assigned based on earning the following points based upon a standard 10-point grading scale:

A = 895-1000
B = 795-894
C = 695-794
D = 595-694
F = 0-594
Course Assignment, Examination, and or Project Policies

Projects (Mid-term 100 points; Final 240 points)
There is a midterm project covering Modules 1-4 (due Module 6) and a final project covering Modules 1-7 (refer to the Schedule for the dates). The midterm project will be to generate insight from a data set and prepare a report based on the insight. The final project will be to use the techniques learned during the weekly assignments on a real data set. You should complete the projects independently and are subject to the UNT honor code and conduct policies/actions.

Discussion Boards (30 points each)
There will be four discussion board assignments. Each discussion board forum will focus on a question related to the textbook reading or supplemental readings that will be posted to Canvas. To earn full points on discussion boards, students must be actively engaged in the group discussion and provide input to each of the assigned questions. Your initial input will earn you 25 points and responding to at least one other peer will earn you the remaining 5 points. As graduate students, it is expected that your responses be thoughtful, respectful, grammatically correct, and show your understanding of the topic being discussed.

Module Quizzes (20 points each)
There will be six (6) quizzes given during the course that are related to material covered in the chapters. Quizzes may be taken up to two (2) times with the highest earned grade counted toward your point total. The quizzes will be multiple questions designed to reinforce the textbook content. Quizzes need to be completed by the due date. Quizzes will be due as indicated on the course schedule. Times listed are Central Standard Time.

Labs/Homework Assignments (70 points each)
There will be six (6) homework assignments given during the course that are related to material covered in the chapters. Assignments will typically include the concepts learned during the week applied on a real data set.

Course Calendar – Spring 2023

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic / Required Reading</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Course overview and Syllabus review</td>
<td>Due Jan 22nd @ 11:59 pm, CST</td>
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<tr>
<td></td>
<td>Module 1 – Introduction to Data Analytics and Descriptive Statistics</td>
<td>Complete Module 1 Discussion Board</td>
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<tr>
<td></td>
<td>Chapter 1: Data and Data Preparation</td>
<td>Take Module 1 quiz</td>
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<td></td>
<td>Chapter 2: Tabular and Graphical Methods</td>
<td>Complete Module 1 analysis assignment</td>
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<td></td>
<td>Chapter 3: Numerical Descriptive Measures</td>
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</tr>
<tr>
<td>Week</td>
<td>Topic / Required Reading</td>
<td>Assignments</td>
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</tbody>
</table>
| **Week 2**  | **Module 2 – Probability and Probability Distributions** | Due Jan 29th @ 11:59 pm, CST  
Take Module 2 quiz  
Complete Module 2 analysis assignment |
| **Class:** 1/24/23 | Chapter 4: Introduction to Probability  
Chapter 5: Discrete Probability Functions  
Chapter 6: Continuous Probability Functions | |
| **Week 3**  | **Module 3 – Sampling and Interval Estimation** | Due Feb 5th @ 11:59 pm, CST  
Complete Module 3 Discussion Board  
Take Module 3 quiz  
Complete Module 3 analysis assignment |
| **Class:** 1/31/23 | Chapter 7: Sampling and Sampling Distributions  
Chapter 8: Interval Estimation | |
| **Week 4**  | **Module 4 – Hypothesis Testing and Inference** | Due Feb 12th @ 11:59 pm, CST  
Take Module 4 quiz  
Complete Module 4 analysis assignment |
| **Class:** 2/7/23 | Chapter 9: Hypothesis Testing  
Chapter 10: Statistical Inference Concerning Two Populations | |
| **Week 5**  | **Module 5 – Inference and Chi-square Tests** | Due Feb 19th @ 11:59 pm, CST  
Complete Module 5 Discussion Board  
Take Module 5 quiz  
Complete Module 5 analysis assignment |
| **Class:** 2/14/23 | Chapter 11: Statistical Inference Concerning Variance  
Chapter 12: Chi-square Tests | |
| **Week 6**  | **Module 6 – ANOVA and Regression** | Due Feb 26th @ 11:59 pm, CST  
Complete Mid-term project |
| **Class:** 2/21/23 | Chapter 13: Analysis of Variance  
Chapter 14: Regression Analysis | |
| **Week 7**  | **Module 7 – Advanced Regression Topics** | Due Mar 2nd @ 11:59 pm, CST  
Complete Module 7 Discussion Board  
Take Module 7 quiz  
Complete Module 7 analysis assignment |
| **Class:** 2/28/23 | Chapter 15: Inference with Regression Models  
Chapter 16: Regression Models for NonLinear Relationships  
Chapter 17: Regression Models with Dummy Variables | |
Course Evaluation

Student Perceptions of Teaching (SPOT) is the student evaluation system for UNT and allows students the ability to confidentially provide constructive feedback to their instructor and department to improve the quality of student experiences in the course.

Course Policies

Class Participation

Students are required to login regularly to the online class site. The instructor will use the tracking feature in Canvas to monitor student activity. Students are also required to participate in all class activities such as discussion board, chat or conference sessions and projects.

Late Work

All work for this course is due no later than 11:59 pm CST on the designated due date. Any assignment submitted after that time will receive a highest possible score of 80%. Additional points may be deducted when the assignment is graded based on the quality of the work submitted. Please don’t lose valuable points this semester by turning in work late. If you have a circumstance that requires additional time to complete an assignment, let me know as soon as possible and we will work out a suitable extension.

The University is committed to providing a reliable online course system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will extend the time windows and provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and contact the UNT Student Help Desk: helpdesk@unt.edu or 940.565.2324 and obtain a ticket number. The instructor and the UNT Student Help Desk will work with the student to resolve any issues at the earliest possible time.

Assignment Policy

Assignments are open book but must be completed without the assistance of peers or others that have knowledge of the course content. Students that engage in academic dishonesty will suffer the consequences per department guidelines. Assignment due dates are posted in the syllabus and on Canvas. Any changes to due dates will be updated on Canvas and communicated in an announcement. For assignments that require you to upload your work, you must submit your files in one of the following formats: .docx, .xlsx, .pdf, or .pptx unless other formats are requested. Do not submit .pages files.

TurnitIn will be utilized an all formal written assignments. All works submitted for credit must be original works created by the scholar uniquely for the class. It is considered inappropriate and unethical, particularly at the graduate level, to make duplicate submissions of a single work for credit in multiple
classes, unless specifically requested by the instructor. Work submitted at the graduate level is expected to demonstrate higher-order thinking skills and be of significantly higher quality than work produced at the undergraduate level. Turnitin is used as a tool to assist students in their scholarly writing to address plagiarism issues. It is recommended that students use this resource to ensure their work is free of copyright issues prior to final submission of their projects.

Instructor Responsibilities and Feedback

- As the instructor, it is my responsibility to help students grow and learn; provide clear instructions for projects and assessments, answer questions about assignments, identify additional resources as necessary, provide rubrics, and continually review and update course content based upon learning outcomes and changes in the field of study.
- Feedback on assignments will be provided in a timely manner. Students can expect responses to emails within 24 hours. Grades for weekly assignments will be posted the following week.

Syllabus Change Policy

While the plan is to follow this syllabus as written, it is not unreasonable to expect that adjustments will be made if necessary due to events that outside of my control. Any changes will be posted in the announcement section of our Canvas course. If these changes impact assignments or due dates, they will be communicated via email as well.

UNT Policies

Student Conduct and Discipline

You are encouraged to become familiar with the University's Code of Student Conduct and the Policy of Academic Integrity found on the Dean of Students website. The policies contained on this website apply to this course. If you have questions regarding any of the information presented regarding academic integrity, please feel free to contact me. I will be happy to review any of your work prior to final submission for grading.

The UNT Code of Student Conduct can be found here: http://deanofstudents.unt.edu/conduct

The UNT policy regarding Academic Integrity can be found here: http://policy.unt.edu/policy/06-003

ADA Policy

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (http://www.unt.edu/oda). You may also contact ODA by phone at (940) 565-4323.
Important Notice for F-1 Students taking Distance Education Courses

Federal Regulation

To read detailed Immigration and Customs Enforcement regulations for F-1 students taking online courses, please go to the Electronic Code of Federal Regulations website at [http://ecfr.gpoaccess.gov](http://ecfr.gpoaccess.gov). The specific portion concerning distance education courses is located at "Title 8 CFR 214.2 Paragraph (f)(6)(i)(G)" and can be found buried within this document: [http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=8&PART=214&SECTION=2&TYPE=TEXT](http://frwebgate.access.gpo.gov/cgi-bin/get-cfr.cgi?TITLE=8&PART=214&SECTION=2&TYPE=TEXT)

The paragraph reads:

(G) For F–1 students enrolled in classes for credit or classroom hours, no more than the equivalent of one class or three credits per session, term, semester, trimester, or quarter may be counted toward the full course of study requirement if the class is taken on-line or through distance education and does not require the student's physical attendance for classes, examination or other purposes integral to completion of the class. An on-line or distance education course is a course that is offered principally through the use of television, audio, or computer transmission including open broadcast, closed circuit, cable, microwave, or satellite, audio conferencing, or computer conferencing. If the F–1 student's course of study is in a language study program, no on-line or distance education classes may be considered to count toward a student's full course of study requirement.

University of North Texas Compliance

To comply with immigration regulations, an F-1 visa holder within the United States may need to engage in an on-campus experiential component for this course. This component (which must be approved in advance by the instructor) can include activities such as taking an on-campus exam, participating in an on-campus lecture or lab activity, or other on-campus experience integral to the completion of this course.

If such an on-campus activity is required, it is the student’s responsibility to do the following:

1. Submit a written request to the instructor for an on-campus experiential component within one week of the start of the course.
2. Ensure that the activity on campus takes place and the instructor documents it in writing with a notice sent to the International Student and Scholar Services Office. ISSS has a form available that you may use for this purpose.

Because the decision may have serious immigration consequences, if an F-1 student is unsure about his or her need to participate in an on-campus experiential component for this course, s/he should contact the UNT International Student and Scholar Services Office (telephone 940-565-2195 or email internationaladvising@unt.edu) to get clarification before the one-week deadline.