Course Syllabus

Welcome to Discovery and Learning with Big Data (IPAC 4340)

I am so excited to have you in class this semester, and I look forward to working with all of you throughout the course.

- **IPAC 4340**: Discovery and Learning with Big Data
- **Credit Hours**: 3
- **Class Location**: Online

Instructor Contact Information

- **Dr. Shon Williams**
- **Office Location**: GAB 102
- **Office Hours**: Mondays 11am-12pm and 2-4pm, Fridays 1 - 3 pm either in person or via Zoom. Please make an appointment to ensure I will be in the office. I will also be happy to schedule a time outside of scheduled office hours if needed. I will also post additional office hours where you can work with the TA for any homework questions. These times will be posted in the announcements after the semester begins.
- **Email**: shon.williams@unt.edu

Communication and Interaction with Instructor:

Communication is essential for a successful semester!

I look forward to getting to know and working with you all. Contact me anytime using my UNT email (Shon.Williams@unt.edu). I will check my email daily and will make every effort to respond within 24 hours. If you have not heard back from me in 24 hours, please feel free to send another email. During the weekend, after Friday at 5 pm, I will get to my email as soon as possible on Monday. Here is a great website provided by CLEAR to give you some communication tips for communicating online: CLEAR has [a webpage for students that provides Online Communication Tips](#)

About Your Professor

Greetings and welcome to IPAC 4340: Discovery and Learning with Big Data. This is my second semester as an Assistant Clinical Professor in the Advanced Data Analytics Department at the Toulouse Graduate School. I have spent over 20 years applying advanced data analytics techniques in the Financial Services Industry, supporting business decisions at American Express, American Express Financial Advisors, Ameriprise Financial, Capital One, and JPMorgan Chase. I am excited to join the great faculty here at UNT and to teach Large Data Visualization, bringing my experience into the classroom. I earned a Ph.D. Degree from Texas A&M in Agricultural Economics, and both bachelor's and master's degrees from Brigham Young University, also in Agricultural Economics.

It is a pleasure to have you in class this semester, and I look forward to working with you.

Teaching Philosophy
I believe in being a lifelong learner. This is essential in the field of Advanced Data Analytics. I am committed to my students' learning and will help them develop a learning framework they can use throughout their careers. The syllabus and course calendar are tools for communicating clear learning objectives, coursework requirements and deadlines to facilitate students' learning.

I like to think of myself as a master gardener with the classroom being my garden. It is my responsibility to provide a safe and welcoming learning environment where my students can thrive. This includes providing context for each learning objective and assignment. It also includes providing timely feedback. It is my responsibility to strategically introduce challenges which promote my students' professional development.

I believe my students have great potential and I believe in their success. It is my responsibility to prepare my students for entering the workforce. Ultimately, my success as a teacher is measured by my students’ success in their future jobs. To help facilitate my students’ future success, I gauge their progress and understanding of the subject matter by establishing performance guidelines in the syllabus, providing timely feedback and grades. My students earn their grades. I understand that “life happens” and I will be flexible when a legitimate problem arises.

Course Pre-requisites, Co-requisites, and/or Other Restrictions

No Pre-requisites

Materials – Text, Readings, Supplementary Readings

Required

We will be using an online interactive textbook this year provided by Zybooks. To access the textbook:

1. Click any zyBooks assignment link in your learning management system (Do not go to the zyBooks website and create a new account)
2. Subscribe

Not Required

These books are NOT required, but you might find them beneficial for extra reinforcement of the material.


Course Description

This course introduces the fundamentals of data analytics and machine learning with big data. This course aims to provide students with theoretical knowledge and practical experience leading to mastery of big data analytics and machine learning, using both small and large datasets. As these fundamentals are introduced, exemplary technologies will illustrate how machine learning can be applied to real-world solutions. The problems are being considered in the context of big data analytics.
Exercises and examples will consider both simple and complex data structures, and data ranges from clean and structured to dirty and unstructured.

**Course Objectives**

- By the end of this course, students will be able to:
  1. Develop an understanding of the fundamental concepts of big data and machine learning.
  2. Apply Exploratory Data Analysis concepts leveraging the Python programming language and the Jupyter Integrated Development Environment.
  3. Develop and articulate results from Supervised and Unsupervised Python Machine Learning models, including correctly identifying algorithms appropriate for the assigned data set.
  4. Develop and articulate results from Supervised and Unsupervised Microsoft Machine Learning Studio models, including correctly identifying algorithms appropriate for the data set.
  5. Apply skills and knowledge learned in class to real-world case study problems and develop Machine Learning models to solve problems.

**Course Topics**

- Python Basics
- Data analytics life cycle
- Data preprocessing
- Exploratory Data Analysis (EDA)
- Big data analytics and machine learning: Overview
- Big data analytics and machine learning: Supervised Linear Algorithms.
- Big data analytics and machine learning: Unsupervised Algorithms
- Big data analytics and machine learning: Evaluating Algorithms
- Big data analytics and machine learning with NumPy, Pandas, Scikit-Learn in Python
- Azure Machine Learning (depending on time)

**COURSE REQUIREMENTS**

- The student will be responsible for daily checking the UNT email announcements and other types of class communication.
- The student will access and follow all course instructions found in the syllabus, announcements, assignments, and all other class-related documents.
- The student will complete all the class assignments in the time frame specified in the class documents, including the course calendar, to participate effectively in-class activities.

**Assignments, Assessments, and Discussions**

- There will be **many assignments** throughout the course. These assignments include separated into Zybook Participation Activities and Zybook Challenge Activities Zybook labs and other assignments. Students are required to submit their homework on time.
- A quiz on plagiarism in Week 1 must be completed with 100% to move on to Week 2. Submitting the quiz indicates that you are aware of what constitutes plagiarism and the
consequence associated with plagiarism. There is also a quick survey that will need to be completed so I can understand the experience of the class.

- There will be **one midterm exam**. The midterm exam must be submitted by the due date. No late work will be accepted. No make-ups will be permitted unless there is documentation through the Dean of Students or prior approval from the professor.
- There will be **several group projects including video presentations**. More information on these presentations will be given as the semester progresses.
- There will be **one final exam**. The final exam must be submitted by the due date. No make-ups will be permitted unless there is documentation through the Dean of Students or prior approval from the professor.

**Make-Up Policy**

No make-up assignments or exams will be offered except for being approved in advance. Students will be required to provide the necessary documentation.

**Late-work Policy**

- All assignments are to be submitted by the due date and time.
- The deadline for submitting assignments (except the final) is 11:59 PM on the due date.
- No late submissions will be accepted.
- I understand that life happens and so for the assignments, I will drop the lowest scoring assignment prior to calculating the final grade.

**Academic Integrity**

ADTA students must read and adhere to the academic integrity expectations of the university, department, and course. The consequences of violating Academic Integrity expectations are outlined below.

**UNT's Academic Integrity Policy 06.003**

- Policy Statement: The University of North Texas promotes the integrity of learning and embraces the core values of trust and honesty. Academic integrity is based on educational principles and procedures that protect the rights of all participants in the educational process and validate the legitimacy of degrees awarded by the University. In the investigation and resolution of allegations of student academic dishonesty, the University's actions are intended to be corrective, educationally sound, fundamentally fair, and based on reliable evidence.

Please understand that “Academic Misconduct,” in this policy, means the intentional or unintentional action by a student to engage in behavior in the academic setting including, but not limited to cheating, fabrication, facilitating academic misconduct, forgery, plagiarism, and sabotage.

**Advanced Data Analytics Integrity Policy**

<p>| Penalty | Other |</p>
<table>
<thead>
<tr>
<th>Academic Integrity Offense</th>
<th>Penalty Description</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Academic Integrity Offense</td>
<td>The minimum penalty is a 0 for the assignment AND a deduction of one letter grade from the final grade for the course. Other penalties may be assessed by the course instructor up to course failure, depending on the severity of the offense.</td>
<td>All Academic Integrity offenses will be reported to the UNT Academic Integrity Office.</td>
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<tr>
<td>2nd Academic Integrity Offense</td>
<td>Suspension from the ADTA program.</td>
<td>A second offense is defined as a separately reported offense either in the same class as the 1st offense or in a different course. Students suspended for a second Academic Integrity violation will not be allowed to enroll in ADTA courses for 1 calendar year. For students who had a single Academic Integrity violation prior to Fall 2023, a second violation will result in suspension from the ADTA program.</td>
</tr>
<tr>
<td>3rd Academic Integrity Offense</td>
<td>Dismissal from the ADTA program.</td>
<td>Students committing a 3rd Academic Integrity offense will be dismissed from the program. For students who had multiple Academic Integrity violations prior to Fall 2023, any additional violation will result in dismissal from the ADTA program.</td>
</tr>
</tbody>
</table>

**My ADTA5340 Class Policy**

Each student in my class can improve by doing their own work and trying their hardest. Students who use other people’s work with or without consent or without citations will violate UNT’s Academic Integrity Policy. Please read and follow this important set of [guidelines for your academic](#).
success (https://policy.unt.edu/policy/06-003). If you have questions about this or any UNT policy, please email me or come discuss this with me during my office hours. Any student suspected of plagiarism and found guilty will receive a zero for the plagiarized assignment. In addition, the student will be reported to the Academic Integrity Office. If there is a second issue of suspected plagiarism (and found guilty), the student will receive a zero for the course and will be once again reported to the Academic Integrity Office (Please see the ADTA Department sanctions above).

Usage of AI

The availability of large language models, such as ChatGPT (chat.openai.com), is rapidly changing the tools available to students and the "real world." The view we will take in this class is that since these tools are widely used in the "real world," banning their use in our class does not make sense. That said, it is important to note that while you may use this tool to help you generate ideas and code, you may not use the tool to create and submit your work. You must acknowledge and cite the source if you choose to use such a tool. This means including quotation marks to indicate statements generated by ChatGPT or other AI tools. Any assignment for which AI is used must be accompanied by an AI appendix including the following:

1. why AI was needed
2. all AI prompts submitted
3. all AI responses.

Additionally, you must understand the content generated by these tools are often incorrect, and it is your responsibility to assess the validity of any output. If used incorrectly and/or not cited properly, this is considered a form of plagiarism and will incur the penalty previously mentioned above in the Academic Integrity Section. We will talk more about this throughout the course.

Attendance Policy

- This class is an online class, therefore there is no in-person meeting where attendance will be taken.
- Students are required to participate in all class activities such as required discussions and group projects. To learn more about campus resources and information on how you can achieve success, go to succeed.unt.edu

Virtual Classroom Citizenship

The same guidelines that apply to traditional classes should be observed in the virtual classroom environment (if needed). Please use proper netiquette when interacting with class members and the professor.

Class Schedule

The following is a tentative schedule. Should any change become necessary, it will be announced via the UNT email. It is the student's responsibility to check for changes in the schedule.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Topics</th>
<th>All homework is due at 11:59 PM on the due date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1: March 18 - 24 Due Date: March 24</td>
<td>Plagiarism, Introduction to Working with Data as a Profession, Python</td>
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<tr>
<td>Week 2: March 25-31</td>
<td>Probability and Statistics</td>
<td>SQL</td>
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<tr>
<td>Due Date: March 31</td>
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<tr>
<td>Week 3: April 1-7</td>
<td>Data Wrangling</td>
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<tr>
<td>Due Date: April 7</td>
<td>Data Exploration</td>
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<tr>
<td>Week 4: April 8-14</td>
<td>Midterm</td>
<td></td>
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<tr>
<td>Due Date: April 14</td>
<td>Group Project 1</td>
<td></td>
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<tr>
<td>Week 5: April 15-21</td>
<td>Regression</td>
<td></td>
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<tr>
<td>Due Date: April 21</td>
<td>Evaluating Model Performance</td>
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<tr>
<td>Week 6: April 22-28</td>
<td>Supervised Learning</td>
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<tr>
<td>Due Date: April 28</td>
<td>Unsupervised Learning</td>
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<tr>
<td>Week 7-8: April 29 - May 8</td>
<td>Extra Credit: Ensemble Techniques</td>
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<tr>
<td>Due Date: May 8</td>
<td>Final Exam</td>
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<tr>
<td></td>
<td>Final Group Project</td>
<td></td>
</tr>
</tbody>
</table>

**GRADING POLICY**

The student's grade in the course consists of the following components:

- **Zybook Challenge Assignments** 10%
- **Zybook Participation Assignments** 10%
- **Zybook Labs** 10%
- **Assignments** 10%
- **Group Projects** 20%
- **Midterm Exam** 20%
- **Final Exam (70% final project, 30% written final exam)** 20%

The final letter grade will be determined as follows:

- A: 90 – 100  
- B: 80 – 89  
- C: 70 – 79  
- D: 60 – 69  
- F: < 60

**Course Evaluation**

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available toward the end of the semester to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from "UNT SPOT Course Evaluations via IASystem
Notification" (noreply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the SPOT website or email spot@unt.edu.

Access & Navigation

Access and Log-in Information

This course was developed and will be facilitated utilizing the University of North Texas’ resources. To be able to access the UNT systems, the student will need his/her EUID and password. If you do not know your EUID or have forgotten your password, please visit the website at http://ams.unt.edu

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.

UNT Help Desk: UIT Student Help Desk (http://www.unt.edu/helpdesk/index.htm)

- Email: helpdesk@unt.edu
- Phone: 940-565-2324
- In-Person: Sage Hall, Room 130
- Walk-In Availability: Call before coming to campus
- Telephone Availability:
  - Sunday: noon-midnight
  - Monday-Thursday: 8 am-midnight
  - Friday: 8am-8pm
  - Saturday: 9am-5pm

- Laptop Checkout: 8am-7pm
- For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

Scholarly Expectations

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.

Instructor Responsibilities and Feedback

The instructor is responsible for responding to student questions about assignments and projects, about the course material presented, and for providing additional resources to enhance understanding of course material. Timely feedback is essential for student success and the instructor is responsible for providing timely feedback to students throughout the course. The instructor will grade submitted assignments and will post grades for students within 10 days of the assignment's due date.

Rules of Engagement
Rules of engagement refer to the way students are expected to interact with each other and with their instructors. Here are some general guidelines:

- While the freedom to express yourself is a fundamental human right, any communication that utilizes cruel and derogatory language on the basis of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal, or state law will not be tolerated.
- Treat your instructor and classmates with respect in any communication online or face-to-face, even when their opinion differs from your own.
- Ask for and use the correct name and pronouns for your instructor and classmates.
- Speak from personal experiences. Use “I” statements to share thoughts and feelings. Try not to speak on behalf of groups or other individuals’ experiences.
- Use your critical thinking skills to challenge other people's ideas, instead of attacking individuals.
- Avoid using all caps while communicating digitally. This may be interpreted as “YELLING!”
- Be cautious when using humor or sarcasm in emails or discussion posts as tone can be difficult to interpret digitally.
- Avoid using “text-talk” unless explicitly permitted by your instructor.
- Proofread and fact-check your sources.
- Keep in mind that online posts can be permanent, so think first before you type. See these Engagement Guidelines (https://clear.unt.edu/online-communication-tips) for more information.

Incompletes
This course will observe the UNT policy on incompletes found here: http://registrar.unt.edu/grades/incompletes

Policy on Server Unavailability or Other Technical Difficulties
The University is committed to providing a reliable online course system to all users. However, in the event of an 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 also contact the UNT Student Help Desk: helpdesk@unt.edu or 940.565.2324. The instructor and the UNT Student Help Desk will work with the student to resolve any issues at the earliest possible time.

Copyright Notice
Some or all of the materials on this course Web site may be protected by copyright. Federal copyright law prohibits the reproduction, distribution, public performance, or public display of copyrighted materials without the express and written permission of the copyright owner unless fair use or another exemption under copyright law applies. Additional copyright information may be located at http://copyright.unt.edu.

Administrative Withdrawal
This course will observe the UNT policy on academic withdrawal found here: https://deanofstudents.unt.edu/withdrawals.

Syllabus Change Policy
Changes to the course syllabus or due dates are not anticipated but should they be necessary, the
instructor will provide ample notification to students to allow them to complete assignments in a timely manner without penalty.

UNT GENERAL POLICIES

Student Conduct and Discipline: Student Handbook.
You are encouraged to become familiar with the University's Policy of Academic dishonesty found in the Student Handbook. The content of the Handbook applies to this course. If you are in doubt regarding the requirements, please consult with me before you complete any requirements of the course.

The UNT Code of Student Conduct can be found here: 

ADA Policy
The University of North Texas makes reasonable academic accommodations for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with an accommodation letter to be delivered to the faculty to begin a private discussion regarding your specific needs in a course. Note that students must obtain a new letter of 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 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 see the Office of Disability Accommodation website at http://disability.unt.edu/. You may also contact them by phone at 940.565.4323.

Drop Policy
The University of North Texas Drop Policy can be found at the following link:  https://registrar.unt.edu/dropping-courses.html.

Important Notice for F-1 Students taking Distance Education Courses: Federal Regulation

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 online or through distance education and does not require the student’s physical attendance for classes, examination or other purposes integral to the completion of the class.

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 experiences 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.

Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004)

The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate.

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Sexual Assault Prevention

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT’s Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim’s compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off-campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565-2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.

Student Verification

UNT takes measures to protect the integrity of educational credentials awarded to students enrolled in distance education courses by verifying student identity, protecting student privacy, and notifying students of any special meeting times/locations or additional charges associated with student identity verification in distance education courses.

See UNT Policy 07-002 Student Identity Verification, Privacy, and Notification and Distance Education Courses (https://policy.unt.edu/policy/07-002).
ACADEMIC SUPPORT & STUDENT SERVICES

Student Support Services

Mental Health

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly care for and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-and-wellness-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testingservices)
- UNT Care Team (https://studentaffairs.unt.edu/care)
- UNT Psychiatric Services (https://studentaffairs.unt.edu/student-health-and-wellnesscenter/services/psychiatry)
- Individual Counseling (https://studentaffairs.unt.edu/counseling-and-testingservices/services/individual-counseling)

Chosen Names

A chosen name is a name that a person goes by that may or may not match their legal name. If you have a chosen name that is different from your legal name and would like that to be used in class, please let the instructor know. Below is a list of resources for updating your chosen name at UNT.

- UNT Records
- UNT ID Card
- UNT Email Address
- Legal Name

*UNT EUIDs cannot be changed at this time. The collaborating offices are working on a process to make this option accessible to UNT community members.

Pronouns

Pronouns (she/her, they/them, he/him, etc.) are a public way for people to address you, much like your name, and can be shared with a name when making an introduction, both virtually and in person. Just as we ask and don’t assume someone’s name, we should also ask and not assume someone’s pronouns.

You can add your pronouns to your Canvas account so that they follow your name when posting to discussion boards, submitting assignments, etc.

Below is a list of additional resources regarding pronouns and their usage:

- What are pronouns and why are they important?
- How do I use pronouns?
- How do I share my pronouns?
- How do I ask for another person’s pronouns?
- How do I correct myself or others when the wrong pronoun is used?
Additional Student Support Services

- Registrar  (https://registrar.unt.edu/registration)
- Financial Aid  (https://financialaid.unt.edu/)
- Student Legal Services  (https://studentaffairs.unt.edu/student-legal-services)
- Career Center  (https://studentaffairs.unt.edu/career-center)
- Multicultural Center  (https://edo.unt.edu/multicultural-center)
- Counseling and Testing Services  (https://studentaffairs.unt.edu/counseling-and-testingservices)
- Pride Alliance  (https://edo.unt.edu/pridealliance)
- UNT Food Pantry  (https://deanofstudents.unt.edu/resources/food-pantry)

Academic Support Services

- Academic Resource Center  (https://clear.unt.edu/canvas/student-resources)
- Academic Success Center  (https://success.unt.edu/asc)
- UNT Libraries  (https://library.unt.edu/)
- Writing Lab  (http://writingcenter.unt.edu/.)