IS 6713: Data Foundations

Instructor: Anthony Rios

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Office Hours: Friday 10am-12pm, or by appointment

Office: Zoom

Web: **www.anthonyrios.net**

Class Hours: Online (Async.)

Class Room: Online

Course Website: Blackboard

Course Description

IS 6713. Data Foundations. (3-0) 3 Credit Hours.

The ability to understand, store, process, transform, cleanse, fuse, and share data is critical to data analytics; and it can often be the most challenging and/or most time consuming part of the data analytics process due to the vast variety of data sources, types, and formats. This course equips students to collect/process common types of data used in data analytics, and provides them a solid understanding of various data sources, types, and formats, and how to handle and process each. Topics include, but are not limited to, structured vs. unstructured data; data compression, encodings, and character sets; and common metadata in use today, such as geospatial data, temporal data, and linked data (e.g., social network linkages). Students will have the opportunity to learn how to store, process, transform, cleanse, fuse, and share data. Exemplar data will be used extensively in the course so that students see and experience a wide variety of data and understand how to process and handle it. Data handling exercises will be provided in the context of scenario based problems to further improve their educational knowledge, practical skill set, and contextual understanding.

Technology Requirements and Support

- Basic computer skills.

- Computer with a web camera and speakers/earbuds/headphones. You can use your own personal device (laptop or desktop). If you need to borrow a device, contact the Tech Cafe (see contact information below) to inquire about checking out a laptop for the semester.

- For more information on accessing desktop computers on campus in the labs and the library, visit the UTSA Student Connect Computer Lab information page.

- Internet access. Wired or reliable connection recommended for online exams and assignments.

- Google Chrome is the recommended browser. Issues may happen if using Internet Explorer or Safari, especially with Blackboard Collaborate and Proctorio. *In case you are having trouble opening or accessing content, clear the cache and try a different browser.* You can run the Blackboard Browser Checker.

- Review the Blackboard Self Help Portal.

- Review the Minimum Technical Requirements for Online Learning page

  If you have a problem with Blackboard and you have already cleared the cache and tried with a different browser, please submit a ticket to University Technology Solutions (UTS) Tech Cafe. Be ready with your course ID and section. A screenshot of the issue will accelerate the troubleshooting process. Always notify the instructor about the issue you are encountering.

University Technology Solutions (UTS) Contact Information

- Email UTS Tech Cafe at techcafe@utsa.edu

- Call UTS Tech Cafe at 210.458.5555

- Visit the UTS Tech Cafe page

Course Materials

Reading assignments and course material will be pulled from the following books:

Python for Everybody: Exploring Data In Python 3 (P4E)
by Charles Russell Severance
Publication date: 4/09/16, 244 Pages
ISBN-10: 1530051126
(Amazon – $0 Kindle version; $9.99 paperback; online Free)
Free URL: **https://www.py4e.com/book**

Python Data Science Handbook (PDSH)
Jake VanderPlas
Publication date: November 2016
ISBN: 9781491912058
(Amazon – $35 Kindle version; $60 paperback; online Free)
Free URL: **https://jakevdp.github.io/PythonDataScienceHandbook/**

Other References:

Data Mining: The Textbook (DM)
by Charu C. Aggarwal
Springer, 4/14/2015, 734 Pages
(Amazon - $85; Also available as free PDF download (whole book or individual chapters) from

lib.utsa.edu » Databases » SpringerLINK e-Books)
Free URL: **https://rd.springer.com/book/10.1007/978-3-319-14142-8**

Computational and Inferential Thinking: The Foundations of Data Science (CIT)
By Ani Adhikari and John DeNero
Free URL: **https://www.inferentialthinking.com/chapters/intro**

Natural Language Processing (2018) (NLP)
By Jacob Eisenstein
Free URL:
https://github.com/jacobeisenstein/gt-nlp-class/blob/master/notes/eisenstein-nlp-notes.pdf

Prerequisites

None. However, given this course requires many programming assignments, basic programming knowledge will be helpful.

Course Objectives

Students should be able to complete the following tasks by the conclusion of the course:

- Create basic programs in Python.

- Understand the data science pipeline with regards to machine learning applications.

- Apply well-known machine learning models to new problems in Python.

- Understand how to evaluate machine learning models.

- Understand how to create datasets for machine learning applications.

Note: This list is neither comprehensive nor absolute. Depending on student expertise, class content may be updated.

Course Structure

Evaluation and Grading

I reserve the right to curve the scale dependent on overall class scores at the end of the semester. Any curve will only ever make it easier to obtain a certain letter grade. The grade will count the assessments using the following proportions:

- **5%** Weekly Labs

- **20%** Quizzes

- **25%** Homework

- **25%** Midterm Exam

- **25%** Final Project

    - 20% Final report, predictions, and code
    - 5% Presentation

The following grading scale will be used (plus/minus grades will *not* be given):
A = 90 - 100%, B = 80 - 89%, C = 70 - 79%, D = 60 - 69%, F = below 60%

Course Policies

Late Policy

A 20% penalty for turning in an assignment 1 day late. If an assignment is more than 1 day late, then you will be given a zero for the assignment. Email me if you need an extension. Do not wait until the last minute.

Course Contents and Communication

All lecture slides, course syllabus, quizzes, homework assignments, homework solutions, exam questions and grading details will be posted on Blackboard (https://utsa.blackboard.com/). All announcement about the course will be made on Blackboard. All questions related to the course (e.g., homework, exam, lecture slides) should be asked on Blackboard Discussion Forum. Please only send emails to the instructor when you have sensitive or emergent issues.

Collaboration Policy

It is okay to discuss your homework with your classmates in high levels or refer to online resources, but each student must understand and complete his/her own assignments and hand in one assignment per student. Moreover, you need to clearly spell out the student names with whom you collaborate in your homework submission or the referred online resource on your assignment on top. Any uncited similarity will be checked as suspicious plagiarism and may result in zero point for that homework. No collaboration is allowed on exams.

General Computing Assistance

The College of Business Academic Computing Department, under the direction of John Soudah, has committed resources to assisting students with their laptops and connection to university data analytics resources. Please see them in BB 3.02.14, call 210-458-7829, or email them at apl@utsa.edu for assistance. Please cc your instructor on emails.

Incompletes

Students who, for non-academic reasons beyond their control, are unable to meet the full requirements of the course should notify the instructor. Refer to catalog for details on Incomplete Grades. Note: Giving of such grades is at the discretion of the instructor. Currently failing the course is not an appropriate reason to seek an 'incomplete' grade.

Academic Integrity and Honesty

Do not cheat. If you cheat, you are not only cheating the class, you are cheating yourself. Students are required to comply with the university policy on academic integrity found in the Code of Student Conduct[1]. If you have trouble with the material, visit during office hours or schedule a meeting for help.

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[1]http://catalog.utsa.edu/informationbulletin/appendices/studentcodeofconduct

Tentative Course Schedule

The following schedule is tentative and is subject to change as the instructor sees fit. See Blackboard for the latest schedule.

Week	Content	Recommend Readings
Week 1	Python: Data Types and Conditionals	P4E Ch. 1, 2, 3, and 6 CIT Ch. 1.1 and 1.2 DM Ch. 1
Week 2	Python: Data Types and Looping Constructs	P4E Ch. 5, 8, 9, 10. Blog on Python Sets
Week 3	Python: File IO and Functions	P4E Ch. 4, 7, and 13
Week 4	Python: OOP	P4E Ch. 14
Week 5	Regular Expressions	P4E Ch. 11
Week 6	ML Pipeline: Data Annotation	NLP Ch. 4.5 and Paper
Week 7	Introduction to Numpy, Vectors, Matrices, and Features	PDSH Ch. 2, DM Ch. 2 and 3 Numpy Tutorial
Week 8	Introduction to Machine Learning with Python I	PDSH Ch. 5 Scikit-learn Tutorial
Week 9	Introduction to Machine Learning with Python II	
Week 10	Midterm Exam	
Week 11	Basic Natural Language Processing with Python	Scikit-learn Text Tutorial
Week 12	Dimensionality Reduction	
Week 13	Bias/Fairness in Data Science	
Week 14	Special Topic	
Week 15	Final Project Presentation Videos Due	

General Information

Public Health Considerations - Spring 2021

The health and safety of our campus community is a shared responsibility of all Roadrunners. It is important to note that none of us can guarantee a COVID-19-free environment. We all must, however, follow the guidelines outlined in the UTSA Public Health Task Force Report ("Report"), and any other applicable policies as may be communicated by the University from time to time. This will include regulating behaviors outlined in the Report including face coverings, daily symptom checks and other appropriate public health behaviors associated with a shared responsibility of reducing transmission of COVID-19. Students, staff and faculty must complete a mandatory compliance training module and self-monitor for COVID-19 symptoms using the UTSA Health Self-Assessment tool before coming to campus (Refer to UTSA's Coronavirus website, the UTSA mobile app, and the LiveSafe app). In addition, students, staff and faculty must get tested if you are showing COVID-19 symptoms and communicate any COVID-19 related health concerns to your supervisor or professor. Failure to abide by these guidelines and requirements may result in disciplinary action in accordance with the student code of conduct or applicable employment policies and procedures. Violations should be reported to the Office of Institutional Compliance via the UTSA Hotline for appropriate action.

FOR FACE TO FACE CLASSROOM AND OTHER ACADEMIC SESSIONS

All members of the UTSA community are required to wear face coverings while on campus (unless in an enclosed office alone, or outdoors where six feet of social distancing is possible, or as otherwise stated below). Face coverings are required for all students while in classâĂŤregardless of the size of the class, the number of students present, or even if other students state they are comfortable if someone isn't masked. If students do not have a face covering when they come to class, they may be asked to leave. If a student has a medical reason that would prevent him/her from wearing a face covering in an academic setting, accommodations can be assessed through Student Disability Services.

ADDITIONAL FACULTY RESPONSIBILITIES

It may be acceptable for faculty to remove face coverings during lectures where a separation of a minimum of six feet can be maintained. Face shields will be made available for special needs and situations. In case contact tracing becomes necessary, faculty will maintain attendance records for all face to face classroom and other academic sessions. Faculty are expected to address students who are not following the above-mentioned procedures while in the classroom. If a student refuses to comply, the faculty must ask the student to leave the classroom and inform the student that he/she cannot return to class until he/she has a face covering on or complies with any other applicable procedure, and must document the incident. If there is any subsequent violation by such student, the faculty member must ask the student to leave the classroom and refer the incident to Student Conduct and Community Standards. The escalation process will follow normal university guidelines through the Student Code of Conduct.

UTSA Student Resources

TECH SUPPORT

- For technical assistance with Blackboard Learn, visit the Blackboard Self Help Portal. Blackboard provides support 24 hours a day, 7 days a week for UTSA faculty and students by phone, email, chat and live virtual consultations.

- Review the Minimum Technical Requirements for Online Learning for required technical specifications for learning online.

- Additional technical support can be accessed by visiting the UTS Tech Cafe page.

- Chrome is the recommended browser. Issues may happen if using Internet Explorer or Safari, especially with Blackboard Collaborate. In case you are having trouble opening or accessing content, clear the cache and try a different browser. You can run the Blackboard Browser Checker.

- To learn about all of the digital tools available to you as a UTSA student visit the Digital Tools Resources page.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

The University of Texas at San Antonio in compliance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act provides âĂIJreasonable accommodationsâĂİ to students with disabilities. Only those students who have officially registered with Student Disability Services and requested accommodations for this course will be eligible for disability accommodations. Instructors at UTSA must be provided an official notification of accommodation through Student Disability Services. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found on the Student Disability Services webpage or by calling their office at (210) 458-4157. Accommodations are not retroactive.

ADDITIONAL ASSISTANCE

If you have issues that we are unable to resolve together, you can contact your current department chair, an associate dean in your college, or UTSA's Equal Opportunity Services & Title IX Office.

ACADEMIC SUPPORT

Supplemental Instruction. Supplemental Instruction (SI) offers student-led study groups using collaborative learning for historically difficult classes. Supported courses and schedules can be found on the Tomas Rivera Center website. You can call the SI office if you have questions or for more information at (210) 458-7251.

Tutoring Services. Tomas Rivera Center (TRC) may assist in building study skills and tutoring in course content. The TRC has several locations at the Main Campus and is also located at the Downtown Campus. For more information, visit the Tutoring Services website or call (210) 458-4694 on the Main Campus and (210) 458-2838 on the Downtown Campus.

Academic Success Coaching   The Tomas Rivera Center (TRC) Academic Success Coaching Program offers one-on-one study skills assistance through Academic Coaching. Students meet by appointment with a professional to develop more effective study strategies and techniques that can be used across courses. Group workshops are also offered each semester to help students defeat common academic challenges Find out more information by visiting the Academic Success Coaching website or call (210) 458-4694.

The Writing Center.   The Judith G. Gardner Center for Writing Excellence helps the entire UTSA Community with various writing projects, questions, and challenges. Our experienced tutors provide assistance to current undergraduates, graduate students, and faculty/staff members with each step of the writing process. Services are located at the Main Campus in the JPL building (2.01.12D) and at the Downtown Campus in the Frio Street Building (FS 4.432). They also offer online tutoring seven days a week by appointment so that you can chat live with a tutor. Visit The Writing Center's website to learn more and to schedule an appointment.

STUDENT SERVICES

Make sure you download the UTSA mobile app to stay connected. Visit the UTSA Mobile App website to access the app download and learn about app features.

UTSA Social Media Channels.   You can follow UTSA departments and organizations on social media. Visit our Social Media Directory page to find your favorite accounts to follow.

Support for Learning Online.   If you haven't had an online course before, Learning Online Student Resources is a good website to help answer all of your questions.

Student Affairs Comprehensive Student Resource List.   UTSA has an extensive amount of resources, tools, programs, and offices. The Student Affairs Student Resources webpage can help you access campus services and general information on most topics.

Counseling Services.   Counseling Services provides confidential, professional services by staff psychologists, social workers, counselors, and psychiatrists to help meet the personal and developmental needs of currently enrolled students. Services include individual brief therapy for personal and educational concerns, couples/relationship counseling, and group therapy on topics such as college adaptation, relationship concerns, sexual orientation, depression, and anxiety. Counseling Services also screens for possible learning disabilities and has limited psychiatric services. Visit the Counseling Services website or call (210) 458-4140 (Main Campus) or (210) 458-2930 (Downtown Campus).

Student Health Services.   UTSA's Student Health Services offers appointments and resources for students related to health education and services. You can find out more about the services offered by visiting the Student Health Services website.

Student Wellbeing Resources. UTSA is committed to the wellbeing of each member of the campus community and recognizes that numerous factors contribute to overall wellness: physical and mental health, diet and nutrition, physical activity, stress management and self-care, social behaviors and more. In addition to the services listed above, UTSA offers the following:

- Student Assistance Services (Student Ombudsperson)

- Behavioral Intervention Team (BIT)

- UTSA Police Department

- Campus Recreation Center

- Center for Civic Engagement

- UTSA Campus Climate Team

- Office of Inclusive Excellence

- Equal Opportunity Services Title IX Sexual Harassment and Sexual Misconduct

- PEACE Center - Prevention, Education, Advocacy, Consultation and Empowerment

The instructor highly encourages you to click on and skim these links, so that you are aware of these services should you ever find you need them. If there are any issues, events, or resources you would like to discuss, please reach out to the instructor. They are happy to listen and help you find the right resources for your situation.

ADDITIONAL UTSA POLICIES

Visit this website for a full listing of A-Z Index. The link provides information on policies and procedures that apply to all students. It includes residence requirements, policies on grades and the grade point average, credit by examination, adding and dropping courses and withdrawal from UTSA, and scholastic probation and dismissal. The most important policies for you are highlighted below.

Family Educational Rights and Privacy Act (FERPA). The Family Educational Rights and Privacy Act (FERPA) is the federal law that protects the privacy of students' education records. This law prohibits Financial Aid, Registrar, Fiscal Services, and many other UTSA departments from releasing any specific student education information without the student's written permission. Parents, guardians, spouses, etc., cannot have access to the student's education records, including account information unless the student has granted authorization through a FERPA/Proxy account in ASAP. Learn more about your student privacy rights by viewing the Family Educational Rights and Privacy Act page by the Office of the Registrar

Campus Carry. Pursuant to HOP 9.48, Carrying of Concealed Handguns on Campus, there are specific guidelines provided by the state of Texas in the presence of weapons on campus. The latest information can be accessed at the UTSA Campus Carry page.

Student Code of Conduct and Scholastic Dishonesty. The Student Code of Conduct is Section B of the Appendices in the Student Information Bulletin. Scholastic Dishonesty is listed in the Student Code of Conduct (Sec. B of the Appendices) under Sec. 203 for more information. For more information on the Student Code of Conduct, contact the Student Conduct and Community Standards team.

Transitory/Minor Medical Issues. In situations where a student experiences a transitory/minor medical condition (e.g. broken limb, acute illness, minor surgery) that impacts their ability to access classes or perform tasks within the class over a limited period of time, the student should reach out to the faculty member.

Sexual Harassment and Sexual Misconduct. UTSA is committed to providing an environment free from all forms of discrimination and sexual harassment, including sexual misconduct, sexual assault, domestic violence, dating violence, and stalking. If a student has experienced or experiences any of these incidents, know that UTSA has resources to help.

UTSA faculty have the responsibility to create a learning environment that is safe and free from hostility. State and federal law as well as UTSA's Faculty Handbook of Operating Procedures (HOP 9.24) require that instructors must report incidents of sexual harassment and sexual misconduct they learn about to the Title IX Coordinator or a Deputy Title IX Coordinator. This means that if a student tells their instructor about a situation (including classroom discussions, written work and/or one-on-one meetings) involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, the instructor must report it to the Equal Opportunity Services Title IX Office. Although the faculty member must report the situation, the student will still have options about how their case will be handled, including whether or not they wish to pursue a formal complaint. The university's goal is to make sure students are aware of the range of options available to them and have access to the resources they need.

If a student wishes to speak to someone confidentially, they can contact any of the following on-campus resources, who are not required to report the incident to the EOS/Title IX Office: (1) Counseling Services at 210-458-4140; (2) Student Health Services at 210-458-4142; or (3) PEACE Center at 210-458-4077.

Campus Safety Emergency Preparedness. UTSA is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:

- Alerts: Ensure you are signed up for UTSA Alerts through your ASAP.utsa.edu account.

- Emergency Procedures: Read through the information related to emergency preparedness on the UTSA Alerts page.

- Safety App: Download the LiveSafe App on your phone through the Apple store or Google Play; visit the LiveSafe App website for details.

- Important Numbers: UTSA Police - Emergency: (210) 458-4911; Non-Emergency: (210) 458-4242

Each one of us play a critical role in making sure ALL ROADRUNNERS are safe, know what to do, and how to stay informed during a campus crisis. Don't be scared, be prepared! UTSAprepared

Inclusivity Statement. The University of Texas at San Antonio, a Hispanic Serving Institution situated in a global city that has been a crossroads of peoples and cultures for centuries, values diversity and inclusion in all aspects of university life. As an institution expressly founded to advance the education of Mexican Americans and other underserved communities, our university is committed to ending generations of discrimination and inequity. UTSA, a premier public research university, fosters academic excellence through a community of dialogue, discovery, and innovation that embraces the uniqueness of each voice.

The Roadrunner Creed

Figure 1. Roadrunner Crest The University of Texas at San Antonio is a community of scholars, where integrity, excellence, inclusiveness, respect, collaboration, and innovation are fostered.

As a Roadrunner, I will:

- Uphold the highest standards of academic and personal integrity by practicing and expecting fair and ethical conduct;

- Respect and accept individual differences, recognizing the inherent dignity of each person;

- Contribute to campus life and the larger community through my active engagement; and

- Support the fearless exploration of dreams and ideas in the advancement of ingenuity, creativity, and discovery.

Guided by these principles now and forever, I am a Roadrunner!

Changes

The syllabus is subject to change at the discretion of the instructor. Any changes/corrections to the course materials, assignment dates, or other updates will be communicated to the students ahead of time. It is your responsibility to check Blackboard for corrections or updates to the syllabus.