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University of Texas at El Paso Department of Computer Science
CS 4364 Topics in Data Science - Spring 2023

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Logistics

Instructor:
Natalia Villanueva Rosales, e-mail: nvillanuevarosales [at] utep.edu.
Class time: MW 1:30-2:50 pm.
Room: EDUC 313
Office hours: MW noon -1pm and 3-4PM (Instructor Dr. Villanueva Rosales), and by appointment outside this time at CCSB 3.0505.
Email: Please use email as the main means to contact the instructor, add [CS4364] in the prefix of the email, and use your UTEP student account. The instruction team will do their best to respond within 24-48 hours of receipt.

Discussion Board: If you have a question that you believe other students may also have, please post it on the 24/7 discussion board in Blackboard.

Announcements: Check the Blackboard announcements frequently for any updates, deadlines, or other important messages. It is recommended that you download the Blackboard Mobile App to receive notifications.

Course Catalog Description

Introduction to advanced concepts and algorithms in data science and their applications. Topics may include deep learning, speech processing, language processing, data integration, information retrieval, and information visualization. May be repeated for credit when topic varies.

Learning Outcomes

Course Outcomes
Divided into the following three broad levels of Bloom's taxonomy:

Level 1: Knowledge and Comprehension.
Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. The material has been presented only at a superficial level. Upon successful completion of the course, students will be able to:

1a. Describe and compare data models (e.g., Entity-Relationship model, ontologies) and how they are currently used for data integration.
1b. Identify current challenges in data management, in particular, aligning with the FAIR principles (Wilkinson et al., 2016).
1d. Describe technical solutions to the challenges in data management related with the FAIR principles.
1c. Identify current trends in data science research, both fundamental and in application domains.
1e. Identify the careers/roles associated with data scientists.

Level 2: Application and Analysis.

Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details. Upon successful completion of the course, students will be able to:

2a. Demonstrate uses of metadata associated with data on the web.

Use a non-relational query language (e.g., SPARQL) to elicit information from a non-relational database.

2b. Use and extend current cyberinfrastructure for the sharing, integration or exchange of data for a specific domain.

2c. Demonstrate the ability to design applications that solve real-world problems that required integration of data.

2d. Demonstrate the ability to write a technical report and present findings.

2e. Demonstrate the ability to work in teams.

Level 3: Synthesis and Evaluation.

Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery. Upon successful completion of the course, students will be able to:

3a. Design a high-level data integration model from a problem statement using standard notation and modeling principles.

3b. Design and implement a tool prototype that enables the integration of data from heterogeneous, decoupled data.

3c. Design and implement an interface proof-of-concept for a data-integration tool applying best practices for privacy, security, and reproducibility of results.

Grading

1. Exams including midterms, final, and quizzes 50%.
2. Project deliveries including assignments and presentations 30%.
3. Active class participation, homework, and activities 20%.

Assignments for this course are assessed according to rubrics. Each assignment will be provided with the corresponding rubric.

Required Materials

A list of readings included scientific papers and book chapters will be provided by the instructor.

Technology Requirements: Course resources, assignments, and tests are delivered through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard. When having technical difficulties, update your browser, clear your cache, or try switching to another browser. **Bring a device to the lectures that can access Blackboard** (smartphone, tablet, or laptop) and can scan a document or take a picture to complete and submit class exercises. Ensure you have access to a computer/laptop to install or update the list of software that will be provided in the

course Blackboard shell and needed to complete assignments. This list will be provided at least a week before the software is needed.

Expectations

Standards of conduct
Scholastic Dishonesty: Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, submission for credit of any work or materials that are attributable to another person. **Cheating** is copying from the test paper of another student. Communicating with another student during a test to be taken individually. Giving or seeking aid from another student during a test to be taken individually. Possession and/or use of unauthorized materials during tests (i.e. crib notes, class notes, books, etc.). Substituting for another person to take a test. Falsifying research data, reports, academic work offered for credit. Paying a person or company to complete coursework (i.e., contract cheating). **Plagiarism** is using someone's work in your assignments without the proper citations. Submitting the same paper or assignment from a different course, without direct permission of instructors. To avoid plagiarism, see http://sa.utep.edu/osccr/wp-content/uploads/sites/8/2012/09/AvoidingPlagiarism.pdf. **Collusion** is unauthorized collaboration with another person in preparing academic assignments.

All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) *for possible disciplinary action*. Students are expected to comply with student standards of conduct, see HOOP: Student Conduct and Discipline.

Netiquette: With online communication, it is possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep this netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action. Additional guidelines will be provided in the Blackboard course shell.

- *Always consider audience.* This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.
- *Respect and courtesy* must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, *address the ideas*, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted in these online spaces is intended for classmates and instructors only. Please *do not copy documents or course content to a publicly accessible website*, blog, or other space.

Attendance and Participation: Attendance in the course is determined by participation in the learning activities of the course. Your participation in the course is important not only for your learning and success but also to create a community of learners. Participation is determined by completion of the following activities:
  - Reading/Viewing all course materials to ensure understanding of assignment requirements

- Participating in an engaging discussion with your peers on the discussion boards and team journals
- Participating in lectures
- Completing session activities (e.g., quizzes, polls) indicated in the Blackboard course shell

Because these activities are designed to contribute to your learning each week, they cannot be made up after their due date has passed. Make-up activities for class participation can only be made up for one unexcused absence in the semester. If you have more than four non-excused absences (see UTEP Catalog for a list of excused absences) you may be dropped from the course with a grade of "W". A 72-hours advance notice may be provided to you via email.

Blackboard Collaborate or Zoom sessions: The instructor may occasionally record lectures or deliver the class virtually using Blackboard Collaborate or Zoom. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. **You may not share class sessions recordings outside of this course.** Doing so may result in disciplinary action.

Course materials:
The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. **They may not be further disseminated.**

Deadlines, late work, and make-up work: The penalty for late work is 10% per 24 hours unless a specific assignment or homework indicates otherwise. Make-up work, exam or quizzes will be given for *documented* emergencies. However, you can request one make-up exam/quiz or class activity for a reason that is not considered excusable or documentation cannot be provided. **It is therefore important to reach out to the instructor—in advance if at all possible—and explain why you missed a given course requirement.** Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

Submissions: It is strongly recommended to submit your work with plenty of time to spare in the event that you have a technical issue with Blackboard, network, and/or your computer. Save all your work (homework, quizzes, exams, and assignments) in OneDrive, the institutional cloud platform as a back-up. A local installation of MySQL is also highly recommended. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through Blackboard, please contact the UTEP Help Desk. Emailing work directly to the instructor should be your last resort.

COVID-19 Precautions. Institutional guidelines for COVID-19 will be followed throughout the semester.

Special accommodations: Students requesting accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the CASS portal.

Student resources: UTEP provides a variety of student services and support:

Technology Resources
- Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources
- UTEP Library: Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.

Individual Resources
- Military Student Success Center: Assists personnel in any branch of service to reach their educational goals.
- Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships.
- Counseling and Psychological Services: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

References

[1] Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018 (2016). https://doi.org/10.1038/sdata.2016.18

NOTES:
When in doubt on any of the above, please contact the instructor to check if you are following authorized procedure.