CSE 476 Introduction to Natural Language Processing - Syllabus (Spring 2025)
Tentative: any information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advance notice.

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Location: Tempe - PSH151 (Physical Science H 151) (Tempe)
Time: Tue/Thu | 9:00 AM-10:15 AM | 1/13/2025 - 5/2/2025 (C)

Course Description:
This course is the introductory level of natural language processing (NLP). We will cover a wide range but relatively easy-to-understand topics of NLP, including the goal and fundamental tasks, traditional and rule-based methods, word embeddings, neural models, and the recent development of transformer-based large language models (LLM). Students will acquire a general understanding of NLP, its classic applications and methods, and further extensions that intersect with artificial intelligence (AI), machine learning (ML), computer vision (CV), and healthcare.

Enrollment Requirements:
Students are expected to be able to use Python and have a basic understanding of probability and linear algebra.

Course Objectives and Expected Learning Outcomes
Students are expected to learn the basics of the following topics:

- High-level goals and objectives of NLP
- Traditional information extraction (IE) tasks, such as part-of-speech tagging, named entity recognition, relation extraction, and event/temporal extraction
- Very basics of traditional methods such as SVM, CRF, and HMMs.
- Word vectors and embeddings.
- Early neural architectures, such as RNN/LSTM.
- More complicated and general NLP tasks, such as question-answering (QA).
- Sequence-to-sequence models and their applications such as machine translation.
- Transformers.
- (Large) Language model (LLM) pre-training.
- Post-training techniques of LLMs, such as supervised fine-tuning (SFT)/instruction-tuning and reinforcement learning from human feedback (RLHF).
- LLM agents and reasoning.
- LLM ethics.
- Visual language model (VLM)
- Special topics on NLP medical applications with a guest lecturer from the Mayo Clinic.

Grading Policies
The grading will be a mixture of in-class attendance, quizzes, in-class exams, homework, and projects. The details will be announced by the time of the first lecture.

Absence Policies
Attendance is required for all lectures. Some grading components (e.g., quizzes/attendance) will be redundant to allow for make-up.

Excused absences for classes will be given without penalty to the grade in the case of (1) a university-sanctioned event [ACD 304-02]; (2) religious holidays [ACD 304-04]; a list of religious holidays can be found here https://eoss.asu.edu/cora/holidays]; (3) work performed in the line-of-duty according [SSM 201-18]. Students who request an excused absences must follow the policy/procedure guidelines. Excused absences do not relieve students of responsibility for any part of the course work required during the period of absence.

Policy regarding expected student behavior
Students in this class are expected to acknowledge and embrace the FSE student professionalism expectation located at https://engineering.asu.edu/professionalism.

Generative AI
This course requires students to use generative AI for specific components of the homework and projects. However, unless explicitly specified, the students must not use any generative AI model to do quizzes or write code for homework. Using generative AI for writing project code is allowed only when explicitly specified in project reports. Students confirmed to be engaging in non-allowable use of generative AI will be sanctioned according to the academic integrity policy and FSE sanctioning guidelines.

Academic Integrity
All engineering students are expected to adhere to the ASU Student Honor Code and the ASU academic integrity policy, which can be found at https://provost.asu.edu/academic-integrity/policy). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. If you have taken this course before, you may not reuse or submit any part of your previous assignments without the express written permission from the instructor.

All student academic integrity violations are reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). Withdrawing from this course will not absolve you of responsibility for an academic integrity violation and any sanctions that are applied. The AIO maintains a record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

Student Copyright Responsibilities
You must refrain from uploading to this course shell, discussion board, website used by the course instructor or any other course forum, material that is not your own original work, unless you first comply with all applicable copyright laws. Course instructors reserve the right to delete materials from the course shell on the grounds of suspected copyright infringement.

The contents of this course, including lectures and other instructional materials, are copyrighted materials. Students may not share outside the class, including uploading, selling or distributing course content or notes taken during the conduct of the course. Any recording of class sessions by students is prohibited, except as part of an accommodation approved by the Disability Resource Center. (see ACD 304–06, "Commercial Note Taking Services" and ABOR Policy 5-308 F.14 for more information).

Policy against threatening behavior, per the Student Services Manual, SSM 104–02 Mandatory statement
Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services (see SSM 104-02). Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

Disability Accommodations
Suitable accommodations are made for students having disabilities. Students needing accommodation must register with the ASU Student Accessibility and Inclusive Learning Services office and provide documentation of that registration to the instructor. Students should communicate the need for an accommodation in enough time for it to be properly arranged. See ACD 304-08 Classroom and Testing Accommodations for Students with Disabilities.

Harassment and Sexual Discrimination
Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, https://eoss.asu.edu/counseling is available if you wish to discuss any

concerns confidentially and privately. ASU online students may access 360 Life Services, https://goto.asuonline.asu.edu/success/online-resources.html.

Photo requirement
Arizona State University requires each enrolled student and university employee to have on file with ASU a current photo that meets ASU's requirements (your "Photo"). ASU uses your Photo to identify you, as necessary, to provide you educational and related services as an enrolled student at ASU. If you do not have an acceptable Photo on file with ASU, or if you do not consent to the use of your photo, access to ASU resources, including access to course material or grades (online or in person) may be negatively affected, withheld or denied.

In the event the instructor fails to indicate a time obligation, the time obligation will be 15 minutes for class sessions lasting 90 minutes or less, and 30 minutes for class sessions lasting more than 90 minutes. Students may be directed to wait longer by someone from the academic unit if they know the instructor will arrive shortly.