CSE 576 – 71542 Topics in Natural Language Processing – Syllabus v1
Fall 2024 - T Th 4:30 PM - 5:45 PM 8/22/24 - 12/6/24 COOR 174

Instructor: Chitta Baral, BYENG 572, chitta@asu.edu
Office Hours: Tu 11:30 AM-12 (https://asu.zoom.us/my/chitta) F 4:00-4:30 PM (office)
TA: TBD

Course Objectives and Expected Learning Outcomes: In this course we will cover several topics in Natural language processing (NLP), several AI techniques used in natural language processing and natural language understanding, and several applications.

The field of NLP is evolving very rapidly and the developments in NLP are impacting the larger AI (Artificial Intelligence) landscape. So, this class will be a mixture of latest developments in NLP, various aspects of NLP, and mathematical and machine learning fundamentals that drive current research in NLP.

To bring excitement to the class we will start out with some latest gripping developments in NLP, then cover the fundamentals, and then systematically progress back towards the latest developments. The start will be on Generative NLP and LLMs (large language models) and what they can and cannot do. The fundamentals that we will discuss include Machine Learning topics such as classification, clustering, Bayesian probability, Hidden Markov Models (HMMs), Conditional Random Fields (CRFs), Deep Learning and Knowledge Representation and Reasoning Methods such as Answer Set Programming. Some of the basic NLP topics that we will cover include Syntactic Parsing, Part-of-Speech Tagging, Sequence Labeling, Named Entity Recognition, Semantic Parsing, Co-reference Resolution and Information Extraction. Some of the applications that we will discuss include Sentiment Analysis, Text Categorization, Text Clustering, Natural Language Generation, Natural Language Understanding, Question Answering, interplay between vision and language, Clinical NLP, and NLP applications to Cybersecurity and Robotics.

Since we will be covering many topics, we will not go very deep into all of them. However, students will be expected to go deep into some of the topics while doing their projects.

Projects: Some projects will be individual, and some will be done in groups of 4-5 students. Components of the class projects are on the cutting edge and in the past several class projects have led to research papers and have helped students in their career. So, you may consider putting your passion and going beyond the minimum in the projects and in the overall class.

Course Material: There will not be any required textbook for the course. The course material will consist of several chapters from books, several research papers and blog entries. A reference book would be: Jurafsky and Martin, SPEECH and LANGUAGE PROCESSING: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition. 3rd edition is available at https://web.stanford.edu/~jurafsky/slp3/ed3book.pdf. The Deep Learning book https://d2l.ai/index.html is also useful for the class.

Grading Policies: The grading will be based on 2 tests (40%); class quizzes, and home assignments (10%), and 2-3 projects (50%). Quizzes and exams will be done live during scheduled class time.

Absence and Make-Up policies: Make-up for valid absences will be normally done through redundancies in the grading components. For example, if there are 12 quizzes then the best 10 of them will be counted. For make up on tests, the finals time will be used.

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.

Faculty recording of class sessions: Class sessions may be recorded by me, and recordings provided to enrolled students, instructors or instructional support personnel. If you have concerns about being recorded, please contact the course instructor. Students need my permission to record anything.

Student behavior:
Students in this class are expected to acknowledge and embrace the FSE student professionalism expectation located at: https://engineering.asu.edu/professionalism/
Cell phones and pagers must be turned off during class to avoid causing distractions

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.

To avoid disruptions, coming late to class (after the first week) is very strongly discouraged and you may not be allowed in if you come late.

Academic Integrity: Students in this class must adhere to ASU's academic integrity policy 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. All engineering students are expected to adhere to the ASU Student Honor Code.

All work submitted for the course cannot have been submitted for any other course or any previous section of this same course. 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.

Unless explicitly allowed by your instructor, the use of generative AI tools on any course assignment or exam will be considered academic dishonesty and a violation of the ASU Academic Integrity Policy. 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.

Student Copyright Responsibilities You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the student first complies with all applicable copyright laws; faculty members reserve the right to delete materials 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 is authorized only for the use of students enrolled in this course during their enrollment in this course. Recordings and excerpts of recordings may not be distributed to others. (see ACD 304–06, "Commercial Note Taking Services" and ABOR Policy 5-308 F.14 for more information).

Disability Accommodations: Suitable accommodations are made for students having disabilities. Students needing accommodations 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.

Harassment and Sexual Discrimination: ASU 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.

Notice: Any information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advance notice.