

## CS 6320.002: Natural Language Processing

**Professor:** Jessica Ouyang      **TA:** TBD

**Term:** Fall 2022

**Meetings:** MW 8:30-9:45 AM ECSS 2.203

### Contact Information

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Office Hours    F 8:30-9:45 AM ECSS 3.403      TBD

### Pre-requisites

CS 5343 — Algorithm Analysis and Data Structures

### Course Description

This graduate course provides an introduction to the field of natural language processing. We will cover core NLP tasks, such as language modeling and parsing, as well as complex applications, such as sentiment analysis, machine translation, and summarization. We will discuss a variety of machine learning approaches to NLP, including both statistical and neural approaches.

### Learning Objectives

1. The ability to perform morphological analysis
2. The ability to compute n-gram statistics and to perform smoothing
3. Knowledge about parts-of-speech and ability to use and understand part-of-speech taggers
4. Knowledge about various parsing algorithms and parsing techniques
5. Knowledge of semantic representations including FrameNet, WordNet, PropBank, and semantic parsing techniques that employ them
6. Knowledge about statistical machine translation
7. Applying the NLP techniques to modern applications, including semantic parsing, social media, and Web document processing

### Required Materials

*Speech and Language Processing*, 3<sup>rd</sup> edition — <https://web.stanford.edu/~jurafsky/slp3/>

### COVID-19 Guidelines and Resources

UT Dallas will follow the public health and safety guidelines put forth by the Centers for Disease Control and Prevention (CDC), the Texas Department of State Health Services (DSHS), and local public health agencies that are in effect at that time during the Fall 2021 semester to the extent allowed by state governance. Texas Governor Greg Abbott's Executive Order GA-38 prohibits us from mandating vaccines and face coverings for UT Dallas employees, students, and members of the public on campus. However, we strongly encourage all Comets to get vaccinated and wear face coverings as recommended by the CDC. Check <https://www.utdallas.edu/covid/response/> for the latest guidance on the University's public health measures. Comets are expected to carry out Student Safety protocols in adherence to the Comet Commitment (<https://www.utdallas.edu/covid/students-families-info/student-safety/>). Unvaccinated Comets will be expected to complete the Required Daily Health Screening. Those students who do not comply will be referred to the Office of Community Standards and Conduct for disciplinary action under the Student Code of Conduct – UTSP5003 (<https://policy.utdallas.edu/utdsp5003>).

### Course Expectations

Students are expected to attend lectures and complete biweekly homework assignments and two exams.

### **Class Attendance**

Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty.

### **Class Participation**

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

### **Class Materials**

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course, however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class, or uploaded to other online environments except to implement an approved Office of Student AccessAbility accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

### **Grading Policy**

Homework	50%
Midterm	25%
Final	25%

There are five homework assignments, each consisting of a programming component and a written component; each homework assignment is worth 10% of the final grade. There are two exams: a midterm and a cumulative final covering the entire course, with an emphasis on later material.

All assignments and exams are to be completed individually; no collaboration is permitted. Any outside resources used (eg. other textbooks, online tutorials, etc.) must be cited in the submission.

### **Late Turn-in Policy**

Late homework turned in within 24 hours of the deadline will receive a 20% point deduction; homework turned in after 24 hours, but within 48 hours of the deadline, will receive a 50% deduction. Homework will not be accepted after 48 hours.

### **Make-up Exam Policy**

Exams will take place during class on the dates shown on the schedule below. Make-up exams will be administered only for well-documented emergencies. A student must make every attempt possible, via email and MS Teams, to notify the instructor that they will miss a scheduled exam. This must be done prior to the scheduled date and time if possible.

Day	Date	Topic	Reading	Homework
Mon	08/22	Course Logistics & Introduction to NLP	Ch 2	
Wed	08/24		Ch 24	
Mon	08/29	Language Modeling	Ch 3	HW1 assigned
Wed	08/31			
Mon	09/05	No Class (Labor Day)		
Wed	09/07	Word Sense Disambiguation	Ch 18	
Mon	09/12	Sentiment Analysis & Classification	Ch 4-5	HW1 due
Wed	09/14			HW2 assigned
Mon	09/19	Part-of-Speech Tagging	Ch 8	
Wed	09/21			
Mon	09/26	Constituent Parsing	Ch 12-13	HW2 due
Wed	09/28			
Mon	10/03	Dependency Parsing	Ch 14	HW3 assigned
Wed	10/05			
Mon	10/10	Machine Translation	Ch 11	
Wed	10/12			
Mon	10/17	Information Extraction	Ch 17	HW3 due
Wed	10/19	Midterm Review		
Mon	10/24	Midterm		
Wed	10/26	Semantic Role Labeling	Ch 19	
Mon	10/31	Word Embeddings	Ch 6	HW 4 assigned
Wed	11/02			
Mon	11/07	Introduction to Neural Networks	Ch 7	
Wed	11/09			
Mon	11/14	Recurrent Neural Networks	Ch 9	HW4 due
Wed	11/16			HW5 assigned
Mon	11/21	No Class (Fall Break)		
Wed	11/23			
Mon	11/28	Attention Networks	Ch 9	
Wed	11/30			
Mon	12/05	Final Review		HW5 due
Sat	12/10	Final Exam Period (TBD)		
Fri	12/16			

## **Comet Creed**

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

“As a Comet, I pledge honesty, integrity, and service in all that I do.”

## **Academic Integrity**

The faculty expects from its students a high-level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrates a high standard of individual honor in his or her scholastic work. See <https://conduct.utdallas.edu/integrity>.

Academic dishonesty can occur in relation to any type of work submitted for academic credit or as a requirement for a class. It can include individual work or a group project. Academic dishonesty includes plagiarism, cheating, fabrication, and collaboration/collusion. In order to avoid academic dishonesty, it is important for students to fully understand the expectations of their professors. This is best accomplished through asking clarifying questions if an individual does not completely understand the requirements of an assignment.

Additional information related to academic dishonesty and tips on how to avoid dishonesty may be found here: <https://conduct.utdallas.edu/dishonesty>.

## **Academic Support Resources**

The information contained in the following link lists the University’s academic support resources for all students. Please go to <http://go.utdallas.edu/academic-support-resources> for these policies.

## **UT Dallas Syllabus Policies and Procedures**

The information contained in the following link constitutes the University’s policies and procedures segment of the course syllabus. Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class. Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

**The descriptions and timelines contained in this syllabus are subject to change at the discretion of the instructor.**