LING 581: Natural Language Processing 1
Fall 2025
TuTh 12:30-1:45 p.m.
EAS 1310

Instructor
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Office Hours: TuTh 3:30-4:30 in-person, or Zoom by appointment

Course description
This course provides a theoretical foundation as well as hands-on (lab-style) practice in computational approaches to processing natural language text. The course will have relevance to various disciplines in the humanities, sciences, computational, and technical fields. Students will gain a thorough introduction to both the basics of deep learning for NLP and the latest cutting-edge research on large language models. Students will additionally collaborate in teams on modeling and implementing natural language processing and digital text solutions. Students will program in Python and use a variety of relevant tools. Students are expected to have basic programming knowledge; however, at the beginning of the course, we will review core Python skills and libraries to ensure everyone is prepared.

Course objectives: By the end of this course, students will be able to:
- Explain foundational techniques and recent advancements in NLP
- Understand and implement basic linguistic feature engineering techniques (e.g., POS tagging, dependency parsing) for training and evaluating models
- Gain hands-on experience, especially through lab sessions, in applying NLP models and exploring their uses across different domains
- Collaborate in teams to design and develop tailored NLP solutions for real-world applications

Class attendance policy: This course takes place in EAS 1310 in person. Attendance is required.

Course website: Course materials will be made available via myCourses. Announcements will take place through myCourses and/or email. Information about assignments and grades, etc., will be made available there throughout the Semester.

Materials (*Notes:* Book is available as pdf. Detailed information will be posted on myCourses):
- Dan Jurafsky & James H. Martin. (2024). *Speech and Language Processing*
- pdf links of academic articles, if necessary

Final grading components [number × points]:
- Lab exercises [8 × 5]: 40% (*Lab exercise 1 will be not graded)
- Background research 20%
    - Assignment [1 × 10] 10%
    - Presentation [1 × 10] 10%
- Final project 40%

    - Final project proposal [1 × 10] 10%
    - Final presentation [1 × 15]: 15%
    - Final paper [1 × 15]: 15%
- Detailed information on each assignment (e.g., questions, guidelines, submission instructions, and scoring rubrics) will be posted on myCourses.

Final grading: At the end of the semester, percentage grades will be converted to letter grades according to the following scale: 93-100% = A; 90-92.99% = A-; 87-89.99% = B+; 83-86.99% = B; 80-82.99% = B-; 77-79.99% = C+; 73-76.99% = C; 70-72.99% = C-; 60-69.99% = D; <60.00% = F.

Late policy:

- **2-hr grading window:** Any assignment submitted online will automatically have a 2-hour grading window. This will be applied by the system, and no action is required from students.
- **Late penalty:** Late assignments will incur a 10% deduction per day, for up to 5 days (e.g., 1 day late = 10% off). After 5 days, the assignment will receive a grade of zero.
- **Extenuating circumstances:** Whenever possible, please request an official document that can prove the circumstances—this allows me to accommodate you fairly while respecting your privacy. If that is not possible, contact me as soon as you can. Extensions are generally not granted retroactively.
- **Final paper:** No extensions will be granted for the final paper, as grades must be submitted promptly at the end of the semester.

Use of AIs: Students are welcome to use AIs for assignments. However, I strongly encourage you not to copy or accept content uncritically. In other words, critical thinking and responsible use of these tools are essential. Students are expected to disclose how they used AIs in completing their work.

Writing consultation: Communicate with the instructor directly or use the resources offered by the Writing Commons: https://www.rit.edu/writing/writing-commons-overview.

Weather: In the case of extremely inclement weather, check myCourses. If I am ever unable to come to campus, I will announce it as soon as possible (at least one hour before the class), plus there will be alternative instructions and assignments.

Statement of academic accommodations: RIT is committed to providing academic accommodations to students with disabilities. If you would like to request academic accommodations such as testing modifications due to a disability, please contact the Disability Services Office. Contact information for the DSO and information about how to request accommodations can be found at www.rit.edu/dso. After you receive academic accommodation approval, it is imperative that you contact me as early as possible so that we can work out whatever arrangement is necessary.

Statement on Title IX: RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance

website. RIT's policies require faculty to share information about incidents of gender-based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators when incidents are stated to them directly. The information you provide to a non-confidential resource which includes faculty will be relayed only as necessary for the Title IX Coordinator to investigate and/or seek resolution. Even RIT Offices and employees who cannot guarantee confidentiality will maintain your privacy to the greatest extent possible.

If an individual discloses information during a public awareness event, a protest, during a class project, or advocacy event, RIT is not obligated to investigate based on this public disclosure. RIT may however use this information to further educate faculty, staff and students about prevention efforts and available resources.

If you would like to report an incident of gender based discrimination or harassment directly you may do so by using the online resources: https://www.rit.edu/fa/compliance/title-ix-home#title-ix-team.

Academic integrity statement: As an institution of higher learning, RIT expects students to behave honestly and ethically at all times, especially when submitting work for evaluation in conjunction with any course or degree requirement. The Department of English encourages all students to become familiar with the RIT Honor Code:
https://www.rit.edu/academicaffairs/policiesmanual/p030
and with RIT's Academic Integrity Policy:
https://www.rit.edu/academicaffairs/policiesmanual/d080.

Emergencies: In the event of a University-wide emergency course requirements, classes, deadlines and grading schemes are subject to changes that may include alternative delivery methods, alternative methods of interaction with the instructor, class materials, and/or classmates, a revised attendance policy, and a revised semester calendar and/or grading scheme. Please familiarize yourself with this set of RIT documents: https://www.rit.edu/emergency-information.

Tentative outline

Week	Date	Topic	Due (**Friday**, 11:59 pm)
1	8/26	Introduction, Word vectors	
	8/28	Lab1 – Python basics	Lab exercise 1
2	9/2	Word vectors	
	9/4	Lab2 – Word vectors	Lab exercise 2
3	9/9	Backpropagation, neural network basics	
	9/11	Lab 3 – PyTorch	Lab exercise 3
4	9/16	Dependency parsing	
	9/18	Lab 4 – Dependency parsing	Lab exercise 4
5	9/23	Basic sequence models	
	9/25	Lab 5 – Text processing (Paper presentation, Final project guide)	Lab exercise 5
6	9/30	RNNs	
	10/2	Lab 6 – RNNs	Lab exercise 6
7	10/7	Attention	
	10/9	Transformers	Background research topic submission
8	10/14	**Fall break (No class)**	
	10/16	Lab 7 – Hugging face	Lab exercise 7
9	10/21	Pre-training	
	10/23	Post-training	Final project proposal
10	10/28	Efficient adaptation	
	10/30	Lab 8 – Prompting LLMs	Lab exercise 8
11	11/4	Benchmark and evaluation	
	11/6	Insights between NLP and linguistics	
12	11/11	Multimodal deep learning	
	11/13	Lab 9 – NLP and L2 assessment	Lab exercise 9
13	11/18	Background research presentation (1, 2, 3)	
	11/20	Background research presentation (4, 5, 6)	Assignment
14	11/25	Wrap up; Final presentation prep	
	11/27	**Thanksgiving break (No class)**	
15	12/2	Final presentation (1, 2, 3)	
	12/4	Final presentation (4, 5, 6)	
16	12/9	**Reading day (No class)**	
	12/11	**No class**	Final paper **(December 11, Thursday)**

Notes. This is a tentative schedule and is subject to change, if needed, for the benefit of students. The instructor's slides will serve as the primary source for students to follow the class. If necessary, specific reading materials will be updated during the semester.