PSYC 681: Natural Language Processing and Large Language Models
Spring 2026
TuTh 8:00-9:15 a.m.
EAS 3381

Instructor
Hakyung Sung, Ph.D. (she/her)
Office: EAS 3173
Email: hksgla@rit.edu
Office Hours: TuTh 9:30-10:30 in-person, or Zoom by appointment

Course description
This course provides theoretical foundation as well as hands-on (lab-style) practice in computational approaches for processing natural language text, for problems that involve natural language meaning and structure. The course has relevance to cognitive science, artificial intelligence, and science and technology fields. Large language models and machine learning, including standard and deep neural network methods, is a central component of this course. Students will develop natural language processing solutions individually or in teams using Python, and explore additional relevant tools and LLMs or related foundation models. Expected: Programming skills, demonstrated by coursework or instructor approval.

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 3381 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 [6 × 5] 30%
  (*Lab 1 and the lowest-scoring lab assignment will be dropped.)
- Quiz (online) [1 × 10] 10%
- Project 53%
  - Identify team members [1 × 3] 3%
  - Project proposal [1 × 5] 5%

    - Midway report [1 × 10] 10%
    - Background research presentation [1 × 8] 8%
    - Final presentation [1 × 12] 12%
    - Final paper [1 × 15] 15%
- Participation 7%
    - Completing ad-hoc events that the instructor announces in class (1%)
    - Active participation in background research presentation (3%)
    - Active participation in final presentation (3%)

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 may use generative AI tools such as Co-Pilot and ChatGPT, as you would use a human collaborator. This means that students may not directly ask generative AI tools for answers or copy solutions. Students are required to acknowledge generative AI tools as collaborators and include a paragraph describing how you used the tool. The use of generative AI tools to substantially complete an assignment or exam (e.g., by directly copying) is prohibited and will result in honor code violations.

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	1/13	Introduction, Word vectors	
	1/15	Lab1 Python basics	Lab 1
2	1/20	Word vectors	
	1/22	Lab2 Word vectors	Lab 2
3	1/27	Backpropagation, neural network basics	
	1/29	Lab 3 PyTorch, Project guide	Lab 3
4	2/3	Dependency parsing	
	2/5	Lab 4 Dependency parsing	Identify team members
5	2/10	RNNs, LSTMs	
	2/12	Lab 5 Sentiment analysis	Lab exercise 4
6	2/17	Self-attention & Transformer	
	2/19	Lab 6 Hugging face	Lab exercise 5
7	2/24	Pre-training	
	2/26	Lab 7 Ollama	Lab exercise 6
8	3/3	Project group meeting	
	3/5	Project proposal presentation	Lab 7
9	3/10	**Spring break (No class)**	
	3/12		Project proposal
10	3/17	Post-training	
	3/19	Lab 8 Constructed anguage	
11	3/24	Efficient Adaptation	
	3/26	LLMs in 2025	Lab 8
12	3/31	Background research presentation 1	
	4/2	Background research presentation 2	Midway report
13	4/7	Benchmarking and evaluation	
	4/9	Question answering and knowledge	
14	4/14	Distillation, Pruning	
	4/16	Reasoning and agents	Quiz
15	4/21	Final presentation 1	
	4/23	Final presentation 2	
16	4/28	**Reading day (No class)**	
	4/30	**No class**	Final paper **(Due May 5, Tuesday)**

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.