RUTGERS
School of Arts and Sciences

Computational Linguistics
01:615:455
Spring 2021

Course format: Asynchronous online (no scheduled lectures)
Course website: canvas.rutgers.edu

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Virtual office: Link to Zoom office
Office hours: Wed, Thurs 2-3pm

About this course

This course is an introduction to the field of computational linguistics, which can be broadly broken down into two areas: **theoretical computational linguistics**, which studies the computational principles behind linguistic competence, and **applied computational linguistics** (a.k.a. natural language processing), which pursues solutions to the engineering problem of developing machines that can understand, analyze, and/or produce natural language.

Students will be introduced to basic issues and techniques in both areas and will practice applying these to actual problems in the computation of natural language.

The format of this course is **asynchronous online**. Video lectures, readings, and other resources will be uploaded to Canvas on a weekly basis and you will be expected to review them within a fixed time frame. Weekly assignments and quizzes will keep track of your progress.

Course learning goals

At the completion of this course, students will be able to:
- Understand basic techniques in designing programs that manipulate natural language
- Apply computational techniques to analysis in phonology, morphology, and syntax
- Understand the computational properties of natural language, independent of whether it is being computed by machines or humans

Department learning goals met by this course:

- Students will reason about language; identify how incorrect or irrational assumptions and prejudices distort understanding of language; demonstrate knowledge about language in the world including a sophisticated understanding of linguistic and cultural variation, and evaluate popular views on the nature of human languages and their speakers.

- Majors and Minors will also demonstrate technical mastery over the tools of linguistic analysis in syntax, phonology and semantics and apply linguistic theory in these areas. They will investigate linguistic data and analyze it; demonstrate strong problem-solving skills; extend their understanding of theoretical linguistics into other domains of linguistic research; apply the techniques of linguistics that they have learned in the core courses to new topics; and access current research in the field. Some students will investigate language in a broader context, where it can be systematically and rationally explored using their sophisticated understanding how language works.

Readings

There is no textbook for this course. All required readings will be posted as pdf files on Canvas, under the `Resources` heading, in the `Readings` folder.

Evaluation and required work

The material in this course will likely be challenging, but it is my job to help you succeed. If you do the readings, come to class and participate, and put decent effort into your homework you will do fine. Please make use of office hours as you find necessary—again, I'm here to help.

Your final grade for this course is based on four categories of graded work: homework assignments, quizzes to check your participation and comprehension, a final project proposal, and a final project.

This class will use a **cumulative grading system**, meaning that the points you earn on each graded piece of work will accrue towards a point goal for the semester for each category. The point goals for each category are given in Table 1. Your final grade for each category will be determined **as a percentage of the point goal for that category**. For example, if you earn 450 points on homework assignments over the semester, you will earn a 90% in the Assignments category (as 450 is 90% of 500).

Importantly, as shown in the third column in Table 1, in some categories **there will be**

Category	Point goal	Available points	% of final grade
Assignments	500	600	50%
Quizzes	200	300	20%
Final project:			
Project proposal	100	100	10%
Final project	200	200	20%

Table 1: Coursework categories and point goals

more opportunities for points than the point goal. For example, over the semester I will assign homework assignments worth a total of 600 points. This means that, for example, you can miss one 60-point assignment and still have more than enough points to achieve a perfect Assignments score. However, any **extra points in one category you earn beyond the point goal cannot be used towards another category** (i.e., they do not count as extra credit).

At the end of the semester your final grade will be converted to a letter grade according to the standard Rutgers system as given in Table 2.

Letter grades	
A	$\geqslant$90%
B+	85–89.9%
B	80–84.9%
C+	75–79.9%
C	70–74.9%
D	60–69.9%
F	$\leqslant$59.9%

Table 2: Letter grade – percentage correspondence table

Quizzes

There will be short quizzes given in each module to check your progress and evaluate your understanding of the material.

Final Exam

There is no final exam for this course.

Assignments

There will be weekly assignments that combine programming in Python and short problems, administered through the Jupyter notebooks platform. All assignments will be turned in electronically via Canvas. **You will be able to drop your lowest two assignment grades.**

Final project

You will be expected to complete a final project that builds on the concepts we cover in the course. **There are two options for the final project:**

a. A (minimum) **five-page paper** on some issue in computational linguistics, either theoretical or applied.

b. A standalone **program** written in Python that builds on one of the techniques that we learned in the class (or some other technique that you are familiar with).

This project is comprised of three parts:

- **Proposal.** Halfway through the semester, you are to write a 250–500 word proposal outlining up to three ideas for your final project. This proposal is due **on Friday, March 11th**.

- **Project.** The final project itself must be turned in by **by 4pm on Monday, May 10th**.

All portions of the final project will be submitted via Canvas.

Schedule

A schedule is given in Table 3. This schedule is **tentative** and subject to change; for updates, **check the schedule on Canvas**.

Policy on late assignments

Homework will be assigned regularly and it will be crucial for you to not fall behind. To get full credit for your work, it must be handed in on or before the due date and time. **The following also holds for the final project.**

- Late assignments **get an automatic 15%** reduction.
- **Assignments more than 24 hours late will not be accepted for credit.**

During the add/drop period, students who join the class late will not suffer the above penalties. However, they are expected to complete all assignments.

Week	Week of	Topic	Notes
1	1/18	Introduction	(Week starts Tuesday.)
2	1/25	Python bootcamp	
3	2/01	Chatbots	
4	2/08	Regular expressions	
5	2/15	Regular expressions	
6	2/22	Corpora	
7	3/01	Ngrams	
8	3/08	Ngrams	**Project proposal due Fri, 3/12**
	3/15	**(spring break)**	
9	3/22	Finite-state machines	
10	3/29	Finite-state machines	
11	4/05	Context-free grammars	
12	4/12	Context-free grammars	
13	4/19	Learning	
14	4/26	Learning	
15	5/03	TBD	(Monday only.)
			Final project due Mon, 5/10

Table 3: Tentative class schedule

Policy on attendance

As there are no scheduled meetings, there is no 'attendance' per se. However, new course content will be uploaded on a regular basis, and you will be expected to keep up with the schedule of assignments and quizzes. If you are unable to meet a deadline due to an illness, religious holiday, or some other event, **please let me know as soon as possible.** Unexplained late work will have a negative effect on your grade (see above).

Academic integrity

It is unethical and unacceptable to pass off anyone else's work as your own. Take a moment to review the university's Academic Integrity policy: academicintegrity.rutgers.edu. All instances of plagiarism will be reported to the Office of Student Judicial Affairs.

Students may not collaborate on answering questions in homework assignments or exams; homework assignments and exams must be done independently. Collaboration is a violation of the Academic Integrity policy.

OIT Help Desk

For any issues you have with Canvas or other apps provided by Rutgers, contact the Office of Information Technology Help Desk at it.rutgers.edu/help-support/.

Disability Services

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: ods.rutgers.edu/students/documentation-guidelines. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: ods.rutgers.edu/students/registration-form.

Counseling, ADAP & Psychiatric Services (CAPS)

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within

Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners. Call (848) 932–7884 or visit rhscaps.rutgers.edu.

Violence Prevention & Victim Assistance (VPVA)

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848–932–1181.

Scarlet Listeners

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space. Call 732–247–5555 or visit scarletlisteners.com.

Just In Case Web App

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD. Visit codu.co/cee05e.