RUTGERS
School of Arts and Sciences

Computational Linguistics

01:615:455

Spring 2024

Lecture location and time:	Scott Hall Rm 204 Mondays & Wednesdays 2:00 – 3:20pm
Course website:	canvas.rutgers.edu
Instructor:	Adam Jardine
Email:	adam.jardine@rutgers.edu
Office:	Linguistics Department (18 Seminary Pl), Rm 205A
Office hours:	Mon 10:00-11:00am

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.

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 mostly on homework assignments and a final project. The percentage-wise breakdown is on the left, and the corresponding letter grades are on the right:

Grading breakdown		**Letter grades**	
Assignments	65%	A	$\geqslant$90%
Final project:		B+	85–89.9%
Project proposal	10%	B	80–84.9%
Project presentation	5%	C+	75–79.9%
Final project	15%	C	70–74.9%
Participation	5%	D	60–69.9%
		F	$\leqslant$59.9%

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 homeworks will be distributed and turned in electronically on Canvas.

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:**

1. A (minimum) **five-page paper** on some issue in computational linguistics, either theoretical or applied.
2. 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, as a physical copy, in class on Wednesday, March 11th**.
- **Short presentation.** In the last two weeks of class, we will have presentations to communicate your final projects. You will be expected to give a **5–7 minute presentation** on your project.
- **Project.** The final project itself must be turned in (either by email or physically) **by 4pm on Monday, May 11th**.

Schedule

A schedule is given in Table 1. 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.**

Week	Dates	Topic	Notes
1	1/17	Introduction	
2	1/22, 1/24	Python bootcamp	
3	1/29, 1/31	Regular expressions	
4	2/5, 2/7	Regular expressions	
5	2/12, 2/14	Corpora	
6	2/19, 2/21	Corpora	
7	2/26, 2/28	Ngrams	
8	3/04, 3/06	Ngrams	**Project proposal due Wed, 3/06**
	3/11, 3/13	**(spring break)**	
9	3/18, 3/20	Finite-state machines	
10	3/25, 3/27	Finite-state machines	
11	4/01, 4/03	Context-free grammars	
12	4/08, 4/10	Context-free grammars	
13	4/15, 4/17	Learning	
14	4/22, 4/25	Final presentations	
15	4/29	Final presentations	**Final project due Mon, 5/06**

Table 1: Tentative class schedule

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.

Policy on attendance

Students are expected to attend and participate in all classes. If you expect to miss one or two classes, please use the University absence reporting website (sims.rutgers.edu/ssra) to indicate the date and reason for your absence. An email is automatically sent to me.

If you must miss class for a period longer than one week, please contact the Dean of Students for assistance in verifying the circumstances of the absence and discussing any necessary accommodations for completing your coursework.

If you have to miss a class for any reason, **please don't ask me what you missed.** Find out what happened in class from the course website or from a classmate, look the material over carefully, and only then come to me with any **specific** remaining questions you may have.

Excessive unexcused absences will have a negative effect on your participation grade.

Mask policy

According to University policy, **masks are optional in class**. Of course, anyone who would still prefer to wear a mask is welcome to do so. Regardless, please fully respect each other's personal decisions regarding the matter. As always, you can check the the University's COVID-19 information page if you have any questions.

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. Given that most of the graded work is completed outside of class time, **I will be extremely sensitive to cheating.** Any work suspected to be completed in violation of the University's Academic Integrity Policy will **automatically be assigned a failing grade.** Repeated instances of plagiarism will be reported to the Office of Student Judicial Affairs.

Use of external website resources such as Chegg.com or others to obtain solutions to homework assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. The same goes for using AI models such as ChatGPT. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions. Posting homework assignments, or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.

You may collaborate to the extent of discussing problems with each other.; however, all work that is turned in must be your own.

Policy on electronic devices

You are more than welcome to bring electronic devices to class, particularly when we are going over code.

However, random web surfing, social media, texting, etc., are strictly prohibited during class.

Getting Help

It has been a rough couple of years, for all of us, but some have been affected more than others. It is important to acknowledge that events and circumstances outside of the classroom can impact our ability to be present and engaged at any given moment. If, at any point, you experience anything impacting your performance or ability to participate in this class, please reach out to me. Please also see the academic, health, and mental wellness resources on the syllabus as well as others searchable at https://success.rutgers.edu/ for further support.

Contacting me

I am here to help! Please get in touch whenever you have questions or concerns. If you have short questions, I can answer them after class or during office hours. If you plan on visiting my office hours, please sign up for a slot using this link **at least 4 hours ahead of time.**

I generally respond to email fairly quickly. However, **do not wait to the last minute** to ask about anything time-sensitive (assignments, etc.). I have a busy schedule and I tend not to check my email after 9pm. That said, I will try my best to get back to you within 2 business days.

Do not email me through Canvas; please use my Rutgers email address. I do not check the Canvas email inbox regularly.

Technical Help

Please visit the Rutgers Student Tech Guide page for resources available to all students. If you do not have the appropriate technology for financial reasons, please email Dean of Students deanofstudents@echo.rutgers.edu for assistance. If you are facing other financial hardships, please visit the Office of Financial Aid at https://financialaid.rutgers.edu/.

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.

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