LING/SLAT 503
Jackson
Summer 2025

Foundations of Syntactic Theory[1]

Course Information

This course is an introduction to syntactic theory with an emphasis on data analysis, critical thinking, and developing a model of grammar to characterize real language data. The type of grammar that we will build takes the generative Chomskian approach to the syntax of natural languages. We will use theoretical frameworks from Chomsky's *Syntactic Structures* in 1957, though the approaches of *Government and Binding*, *Principles and Parameters*, and the *Minimalist Program* extending nearly to the present day, and will cover the concepts of constituency, phrase structure rules, X'-theory (pronounced "X-bar"), binding theory, head movement, DP movement, *wh*-movement, argument structure & ditransitive verbs, and control & raising.

Course objectives

We will examine the syntactic structure of language within the *generative* framework of syntax. In this approach, the linguistic knowledge of a human language speaker is modeled by a formal, symbolic (ie, not probabilistic) system of rules and constraints which can generate all and only the sentences that are part of the speaker's language.

Although we label this approach *generative*, it is generative in a particular formal sense of that word. Our generative process should not be confused with the actual time-based process of the generation of a sentence by human speakers of a language, which we'll leave as a problem of psycholinguistics and language processing. The formal sense in which our model is *generative* is that we will create a finite set of rules, constraints, and lexical items, and by applying all possible options and orders of combining these elements, we will produce an unbounded set or *enumeration* of the possible sentences in a language.

To put it another way, if we consider all possible combinations of all the words of a language, we are creating a formal mechanism which will be able to produce some, but not all, of those combinations—namely, just the combinations that are grammatical. For example, for sentences that are built using the words "the", "dog", and "barked", the model of grammar that we'll build will provide a way to build the grammatical sentence "The dog barked", but will provide no way to assemble these three words into the sequences "Barked dog the", "Dog barked the", and all other ungrammatical sequences. We'll be designing a formal mechanism of words and procedures for combining them such that all of the possible word sequences that it produces are all and only the acceptable sentences of that language, and there is no way for that system to produce any word sequences that are not acceptable sentences.

[1]The original development of this course was done by Andrew Carnie and later adapted by Jianrong Yu.

As we go through the process of developing this model, we will see how various modules of human language systems—primarily the semantic and morphological modules—interact with syntax to affect whether a sentence is grammatical or not, and how universal constraints control or limit a sentence's grammaticality. Since summer sessions of this course are primarily taken by students in the *Master's in Human Language Technology* program, our approach to building a formal grammar will emphasize the coverage of empirical data that would be required in order to appropriately model the full range of human linguistic competence. **For HLT students, consider this course an exploration of the range of natural language data and an application of formal tools for modeling grammar.**

We will...

- progressively build a formal system (ie, a model or a grammar) to characterize grammatical and ungrammatical sentences in human language.
- apply principles that have guided the historical development of syntactic theory.
- apply the scientific method to generalize data, form hypotheses about a model, and test them against more data.
- compare syntactic models by evaluating their conceptual and empirical strengths.
- develop hypotheses based on language data and evaluate arguments to support those hypotheses.
- practice structuring arguments in a coherent and convincing way.
- develop skills of analyzing data across a wide variety of distinct languages, to create a model whose possible alternative structures explain not just the behavior within a single language, but also variations between languages.
- compare and contrast hypotheses about models of possible and impossible human languages.

Learning outcomes

By the end of this course, successful students will...

1. be able to describe the complexity of sentence structure in human language.
2. be able to compare theories of syntax conceptually and empirically.
3. be able to identify the data needed to confirm or refute a hypothesis regarding a model of language.
4. develop skills to analyze data across a wide variety of human languages.[†]
5. be able to give structural analyses of natural language sentences, which form the basis of practical applications in natural language processing and parsing.[†]
6. be able to use tools for representing the structure of sentences in natural language.[‡]

† relates to Linguistics HLT program outcome #2.

‡ relates to Linguistics HLT program outcome #3.

HLT program learning outcomes

By completion of the HLT program, students will be able to:

1. **Write, debug, and document readable and efficient code** in programming languages commonly used to develop, implement, and evaluate HLT models, as demonstrated through course projects and a professional internship.
2. **Select and apply appropriate algorithms and core concepts** in HLT to perform common tasks and solve realistic problems, as demonstrated through course projects and a professional internship.
3. **Apply common tools and libraries** used in HLT by integrating them into course projects and real-world applications or workflows, as demonstrated through course projects and a professional internship.
4. **Demonstrate professional skills** in the field of HLT, including effective teamwork, clear and concise communication, professional networking, understanding of business procedures and team-based code development, leadership, and critical thinking, as demonstrated through course presentations, projects, and a professional internship.

Locations and Times

This is an asynchronous online course. According to University of Arizona policy, class attendance is demonstrated by active participation in course-related online activities, such as interacting with D2L pages, the course forum, OpenClass exercises, and so on. Course sessions will not be held in-person. Please see the course D2L page for important dates and further information.

Prerequisites

None

Instructor

name	Eric Jackson
email	ejackson1@arizona.edu
hours	Mondays 10:00am–12:00pm (Arizona time, UTC-7) in person (COMM 114A) and online via Zoom at `https://arizona.zoom.us/j/84420158691` (passcode 074337), and by appointment.

This is an asynchronous course, so we won't meet at a single time for class to happen. There are no sessions at which I will take attendance. My working hours are normal business hours in Arizona, and I generally do my preparation and grading for the course at that time.

The best way to contact me is to send me an email or a forum message. I try to respond within 24 hours, but *during* working hours, I may be grading coursework, meeting with someone, or recording lectures, so my response may not come immediately. If there's a chance you may need my response, don't wait to discover that when a deadline is upon you.

I know that normal business hours in Arizona are not convenient for everyone in this course. If you need to meet outside of Arizona business hours, I'm holding Thursday evenings open. Contact me in advance to set up a time and a link; I won't otherwise be online then.

Course forum (Zulip)

For this course, we'll use a forum that is outside the course website, though still provided by the university. Some participation-graded activities will take place on this forum, so make sure you sign up in the first week.

In addition to the assigned forum activities, you're free to start discussions there with the class, or post questions about the course. Bear in mind that responses from the forum (from me or from other students) may be quick, but this is not guaranteed. You should plan as if forum responses may take twelve or more hours.

Textbook and readings

The textbook we'll use in this course is available for free (digitally) through the library. You'll need to log in to UA Libraries with your NetID and password to access the book in this way. You are also free to obtain a paper or digital copy of this textbook on your own.

Carnie, Andrew. 2012. *Syntax: A generative introduction*, 3rd edn. John Wiley & Sons.

ISBN-13: 978-0470655313

`https://arizona-primo.hosted.exlibrisgroup.com/permalink/f/evot53/01UA_ALMA51636404370003843`

There is a 4th edition of this textbook, but it is not yet available digitally through the library. Until it's available digitally, we'll stick with the 3rd edition.

Supplemental readings, if any, will be provided digitally through the course website.

Requirements and grading

Students are expected to actively participate in the course by watching the recorded lecture videos, reading and digesting the assigned readings, completing any assigned homework or activities, and engaging with the instrucror and other students in the course forum. You are all adults, and I expect you to take responsibility for your own learning.

Readings

Readings from the textbook will be assigned for each unit of the course. You may read the assigned sections before you watch the lectures, **but you must read the assigned sections and complete**

any reading-based activities before the end of that week. Watching the lecture videos is not a substitute for understanding the readings. (See *Participation-graded activities* below.)

Lectures

Lecture videos will be available through the course D2L page. You are expected to watch all lectures and understand the content.

If the content of a unit is not clear to you on the first viewing, don't panic. Make sure you've done the readings from the textbook, and try watching the lectures a second time. You're free to search for other presentations of the same topic online, but note that other explanations online may use different assumptions from those that we'll use in this course. If a concept is still unclear, you should send a question to the instructor by email, meet with the instructor in regular office hours or arrange another time to meet, or post a question for clarification on the course forum.

Homework

There will be seven graded homework assignments, one each week. Note that the last week is shorter than others. Graded homework assignments will be given via D2L. Student homework submissions will also be collected through the assignment item in D2L and must be in PDF format; files submitted in any other format (.doc, .docx, .rtf, .odt, .txt, or any other) will not be accepted. Freely available options to convert files to PDF include Google Docs and LibreOffice. Handwritten assignments are acceptable, so long as they are in PDF format and are reasonably legible.

Participation-graded activities

In addition to the graded homeworks, there will be three types of ungraded assignments. Completing these assignments before the due date and time is all that is required for full credit.

One type of participation-graded activity is a weekly response to the assigned reading. You will post these on the course forum in response to prompts that will be provided on the course website, under the each week's **Reading** item. Although you are minimally required to post your own response to the reading, you are encouraged to read and respond to other students' posts, as well.

The second type of participation-graded activity is a question set that is embedded in some of the videos. Some questions are open-ended, while others have specific answers. Questions with specific answers can be attempted *multiple times* until you arrive at the correct answer. They are not intended to add stress, but to break up long videos and to get you actively thinking about the content of that video. Although your answers are not graded for content, doing your best to answer them by applying the content from the video *will* affect how much of the course content you understand and retain. Please note that you must complete watching all of a video lecture before your grade on that video's questions are recorded in D2L's gradebook.

The third type of participation-graded activity will be a weekly OpenClass Review & Mastery activity. These activities give you another opportunity to practice applying the concepts from the week in a setting where it's perfectly fine to get an answer wrong. After you complete your own answer, you'll be shown a model answer to the same question. I encourage you to compare your answer to the model, to see if there were elements you could have added to make your own answer stronger or more complete. **The tree-building exercises in OpenClass are also a**

great opportunity to see "model" trees that may help you on the graded homework assignments.

Grading

Participation-graded assignments are graded as one point for completion or zero for non-completion. All your graded assignments are given numerical scores, with the number of points available specified for each assignment. A final course grade of A, B, C, D, or E will be given. The following minimum percentages will guarantee the corresponding letter grades, in accordance with university policy:

A: 90–100%
B: 80–89.9%
C: 70–79.9%
D: 60–69.9%
E: 0–59.9%

The assignments and activities will contribute to your final grade as follows:

type	number	total
homework assignments	7	60%
video questions	55	10%
reading responses (forum posts)	7	15%
Review & Mastery activities	7	15%
total		100%

The due date for each assignment will be posted with the assignment in D2L. All times will be given in Arizona time (Mountain Standard, GMT-7). If you have an unexpected life event that will keep you from completing an assignment on time, talk to me about accomodation as soon as you can. **Late work, except as allowed by university policy, will not be accepted.**

Course schedule

The course is divided into seven topical modules, one each week, with readings, lectures, activities, and assignments for each module. All course material are available on D2L. Specific pages for each official reading assignment will also be found in D2L. All dates and times for the course are in Arizona Mountain Standard Time (MST-7).

Start date	Unit topic	Reading
5/19/25	Unit 1: Preliminaries	Ch 1, 2, end of 3
5/26/25	Unit 2: PSRs and Binding	Ch 3, 4, 5
6/2/25	Unit 3: X'-theory	Ch 6, 7, 8
6/9/25	Unit 4: Head and DP movement	Ch 10, 11
6/16/25	Unit 5: *Wh*-movement	Ch 12, 13
6/23/25	Unit 6: Ditransitive verbs, control and raising	Ch 14, 15
6/30/25	Unit 7: Advanced binding theory, wrap up	Ch 17

Technology

This course won't involve programming in the same way that other HLT courses do. However, I may point you to some tools that will help you work with the concepts we're learning in this course. If I point you to it, it means I've at least gotten it to work for me—and I can provide limited support in getting things running for you, too. I have a preference for web-based or cross-platform solutions, but since I'm running Linux, I may not be able to help with the specifics of getting things running in Windows or MacOS.

Student collaboration and appropriate use of AI

The purpose of this course is to train **your** mind, and to do that, you need to **use** your own mind. You will gain the most benefit from the programming and other assignments in this course if **you** are the one who has come up with all the code, analysis, or examples, even if this requires a bit of mental struggle on your part to get it right. **Don't be afraid to struggle for a bit, because that struggle is likely helping you learn.** Beyond a reasonable amount of struggle, however, it's reasonable to seek outside help from the instructor or another source.

Students are encouraged to discuss problems and general approaches for solutions with the instructor and with others in the course, but everyone must turn in work that is the product of their own mind. You may not submit assignments that are substantially the same as any other source (your classmates, someone online, or an AI tool), including using someone else's code but simply changing the variable or object names.

If you do feel you need outside help, using portions of code you found online or created with Generative AI is acceptable, but it must constitute no more than 25% of your total code. If you obtain code other than writing it yourself, **you must evaluate it critically and cite where it came from**.

If you discuss an assignment with a peer, if you find inspiration from a web resource, or if you use AI for appropriate help (ie, not simply copying and pasting its answer as your own), you must cite that fact on your assignment:

- "I discussed this assignment with Jane Studentname and Joe Wildcat."
- "I used ChatGPT 4 for brainstorming of approaches to this coding task."
- "I wrote this code following a suggestion from StackOverflow at <URL>"

Generative AI is a useful tool, like a calculator is a useful tool for doing math, but generative AI for programming is like a calculator that is sometimes completely untrustworthy. In some contexts, being able to use a calculator is an important skill—while in other contexts, like when you're taking a math test to see whether you know basic math facts, solely using a calculator short-circuits your own learning. A bicycle is a tool that allows us to get from one place to another faster and more efficiently than running—but if you're going to be tested in your time for a 5k run, it won't help you to train for running solely by riding a bicycle. You will likely need to know how to use generative language models for tasks at some point, but having one write your homework or forum posts for this class is not appropriate. Put in the thinking yourself, so that you can reap the mental benefit for yourself. You need to know how to perform these programming tasks on your own well enough

that you can see where some AI-generated code is partially or completely off the mark, or introduces logic errors even if it runs without runtime errors.

The general principle in all such cases is that the majority of the work you turn in must be new and must be your own. Do your own work, and please ask me in advance if you are unsure whether something will be acceptable or not. Assignments that seem suspiciously similar, or those that seem to have been mostly produced using generative AI, will be forwarded to the Dean of Students office in accordance with the Code of Academic Integrity (linked below). Please be a responsible adult and don't run the risk of losing credit for an assignment by copying, by allowing others to copy from you, *or* by having ChatGPT do your assignment for you.

The UA Library has a guide for students as to what is and is not appropriate use of AI and similar resources:

`https://libguides.library.arizona.edu/students-chatgpt/`

University boilerplate

All of the following items are required by the university to be included on syllabi. If you find something here that is surprising or unexpected, please bring it up with me as soon as possible.

By way of a brief summary:

Disabilities If you have a disability that affects how you will need to do the work in this class, please let me know *within the first week of class.*

Academic Code of Conduct Cheating and plagiarism are not remotely acceptable in any way. You are responsible for knowing whether your own behavior qualifies as plagiarism, and whether your use of AI is inappropriate. Disruptive behavior in class—which here includes audio, video, or text on any of our course websites or by email—is not acceptable. Please be respectful of others.

Sensitive Material This is a university and you are adults. It is possible that we may touch on topics that some students could find sensitive during the semester. Given the focus of this course, this seems unlikely, but I alert you nonetheless.

Health & Wellbeing

The university has a specific site for COVID information: `http://covid19.arizona.edu`. If you are experiencing personal or financial challenges from any health-related issue, let me know as soon as you can if we need to make accommodations, and please stay safe.

The semester ahead may come with ups and downs in both physical and mental health, but there are lots of ways to support yourself. Eat well, get regular exercise, and don't neglect things like self-care, talking with friends and family, or getting a fresh perspective from a supportive group. Stress is a normal part of life and may even motivate you sometimes, but chronic or overwhelming stress can affect your physical and mental health and wellbeing. Pay attention to your personal signs that you're overly stressed, like changes in your mood, appetite, sleep, behavior, or new physical symptoms (aches, pains, etc.) that interfere with school and daily life. If you notice these

signs or have questions about helpful resources, I welcome you to talk with me. You can also visit caps.arizona.edu/mental-health for mental health tools and resources.

Mental Health & Wellness Resources

- **Health & Wellness:** Campus Health provides quality medical, mental health, and wellness services for students. Visit health.arizona.edu or call 520-621-9202 (520-570-7898 for help after hours)
- **Mental Health:** Campus Health's Counseling & Psych Services offers a range of mental health support tools and services like self-care strategies, peer support, groups and workshops, and professional mental health services. Visit caps.arizona.edu/mental-health or call CAPS 24/7 at 520-621-3334 to learn more.
- **Crisis Support:**

  Suicide & Crisis Lifeline: call 988 Crisis Text Line: text TALK to 741-741 Visit preventsuicide.arizona.edu for more suicide prevention tips and resources

Absence and Class Participation Policy

Attendance in an all-online course is not evaluated like attendance in an in-person course. For this course, attendance will be represented by active reading, completion, and participation in online course activities, including loading/viewing materials and completing activities posted on D2L, OpenClass, our course forum, and any other related websites.

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop

The UA policy regarding absences is that any sincerely held religious belief, observance or practice will be accommodated where reasonable, http://policy.arizona.edu/human-resources/religious-accommodation-policy.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: https://deanofstudents.arizona.edu/absences

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities.

Students are asked to refrain from disruptive conversations with others in the course, including on asynchronous course platforms. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue inappropriate behavior will be removed from that venue and may be reported to the Dean of Students.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See `http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students`.

Accessibility and Accommodations

At the University of Arizona, we strive to make learning experiences as accessible as possible. If you anticipate or experience barriers based on disability or pregnancy, please contact the Disability Resource Center (520-621-3268, `https://drc.arizona.edu/`) to establish reasonable accommodations.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. **If you use a code snippet that you came up with from discussions with a classmate, that you found online, or even that you got from a large language model, it's important to cite where it came from, whether that source was Sally Classmate, GitHub.com, stackexchange.com, or ChatGPT.**

Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: `http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity`.

The UA Library provides a helpful learning module for students to understand and avoid plagiarism: `https://libguides.library.arizona.edu/info-strategies/plagiarism`

The UA Library also has resources to guide you to appropriate and safe use of AI and large language models: `https://libguides.library.arizona.edu/students-chatgpt/integrity`

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see

`http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy`

Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.