

LIN 2xxx: Language and Computers

Quest 2

I. General Information

Class Information

- Spring 2025
- **Lecture Time:** asynchronous
- **Lecture Classroom:** Canvas
- **Discussions:** Fridays various times

Instructor

- Sarah Moeller
- smoeller@ufl.edu
- **Office:** Turlington 4017
- **Hours:** W 10:20-12:20

Teaching Assistants

- | | | |
|----------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------|
| ● Cesar Rosales | ● Leah Honsinger | ● Jessica Heady |
| ● rosalesc@ufl.edu | ● dhonsinger@ufl.edu | ● headyj@ufl.edu |
| ● Office: | ● Office: | ● Office: Dauer 36 |
| ● Hours: | ● Hours: | ● Hours: |

Course Description

Identifies and explains the cross-disciplinary dimensions of AI for natural language processing (NLP) through social science principles of human communication (e.g. conversational turn-taking), linguistics theory (e.g. how to build sentences), and computer science (e.g. ASCII vs. Unicode). Examines topics in the context of globalization, language endangerment, and the recent rapid rise of AI. Assumes no background in linguistics or computer science.

More about this course...

Language technology has a profound influence on the way ordinary people use language. This morning, because you speak English, you may have already used voice recognition or predictive text. This course explains what language technology is and why it is available for about 1% of the world's languages. Along the way, we will attempt to answer a pressing question for our society: **Can artificial intelligence be inclusive of all ways of speaking all languages?**

This course introduces the fundamentals of linguistics, computer science, and statistics to peek under the hood of AI. Students will analyze digital systems that “understand” human language. They will explore how societies around the world experience language technology and reflect on their own use. Assignments require students to connect analytical, linguistic, and technological skills to human and AI behavior that they are encountering in their personal and professional life. They will be asked to discover and communicate a reasoned critique or recommendation to challenges that arise when we “teach” computers to process human language.

Quest and General Education Credit

- Quest 2
- Social & Behavioral Sciences
- Writing Requirement (WR) 2000 words

This course accomplishes the [Quest](#) and [General Education](#) objectives of the subject areas listed above. A minimum grade of C is required for Quest and General Education credit. Courses intended to satisfy Quest and General Education requirements cannot be taken S-U.

Required Readings and Works

- **Textbook:** Glass, Leila, Dickinson, Markus, Chris Brew, and Detmar Meurers. **2024. *Language and Computers***. (Textbooks in Language Sciences 14). Berlin: Language Science Press. DOI: 10.5281/zenodo.12730906 (LaC on schedule).
Download: <https://langsci-press.org/catalog/book/454>
- **Writing manual:** “The Only Guide to Essay Writing You’ll Ever Need”. Grammarly Blog: <https://www.grammarly.com/blog/essay-writing/>
- Any additional readings will be available on Canvas.
- **Required citation style is APA:**
https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/index.html We recommend using a citation management software or an AI tool to assist handling citations and building a bibliography.
- For help with brainstorming, formatting, and writing papers visit the writing studio at <http://writing.ufl.edu/writing-studio/> or in Library West, Rm. 339.
- Materials and Supplies Fees: n/a

II. Graded Work

Description of Graded Work

The grade for this course is based on attendance and participation (both in-person and online), 6 homework assignments, 6-10 quizzes, 1 essay (fulfilling the common writing requirement), and 1 exam. Late assignments will not be accepted without an official accommodation letter, no exceptions. No makeup is allowed for in-person quizzes and activities without excused absences (e.g. a doctor’s note).

Extra Credit: We provide extra credit opportunities to make up for absences. These opportunities encourage students to participate in events on campus that are related to AI for language technology. Extra credit is available upon request during the instructor’s posted office hours. Extra credit must be requested before the end of Week 12 and submitted by the last day of classes.

Online Participation	5%
Quizzes	10%
Attendance and In-Person Participation	15%
Homeworks	40%

Writing Requirement (final version)	15%
Final exam	15%

Attendance and In-Person Participation: Attendance at Friday sessions is critical. Occasionally activities must be turned in for in-person participation and attendance. Quizzes can only be taken in person on Fridays. Peer reviews of essay drafts are a sizeable portion of the in-person participation grade; therefore, missing a Friday session may affect your quiz and homework grade as well.

Online Participation: Nearly every week, students will take a practice quiz or do an activity that is submitted on Canvas before the Friday discussion sessions. Practice quizzes can be retaken unlimited times until the due date. The activities are assessed based on the submissions (e.g. provide an example of “non-word spelling errors”, explain the source of ambiguity in these headlines, etc.). Unless the activity instructions state otherwise, activities are assessed for thoughtful engagement with material, rather than completion or writing style & mechanics. Activities are designed to check understanding of concepts and terms, prepare students for homework and enhance meaningful discussions on Fridays.

Homework Assignments: Homeworks walk students through the process of drafting and writing their final writing requirement. They are due about every two weeks. Students are encouraged to help each other with assignments, but all submitted work must be your own. Professional use of AI is required for most homeworks, but this use must not go beyond what is described in the homework instructions. Homeworks generally require some interaction with language technology (sometimes done as an independent activity) and a written reflection on what you learned from that interaction.

Final Exam: The final exam tests knowledge of terminology, concepts, and mathematics covered in lectures and readings.

Writing Requirement (WR): The writing requirement is a 2,000-word essay counting towards the 24,000-word common writing requirement (formerly known as the Gordon Rule). The writing assignment ensures students maintain their writing fluency, use writing as a tool to facilitate learning, and perform independent research to support and clarify their writing. The essays will be graded based on the rubric provided in this syllabus, plus additional written guidelines in the homeworks. The grade may depend in part on students’ response to the feedback they receive on their writing skills.

Students will submit a final essay of **2000-2225 words** that critically analyzes an issue related directly to language technology and its impact on human society. Every paragraph must have a clear thesis statement. Every thesis statement must be supported with explanations and clarified by examples. All claims must be supported by appropriate sources that show the student makes educated use of quotes and citations. Students must include a bibliography using the required citation style. The final essay must include a descriptive title, an introductory paragraph and a conclusion paragraph. The essay must respond directly to each of the prompts below, with a minimum of one paragraph per prompt.

1. What is one current issue that is related to how or whether computers can store, represent, generate, or process (“understand”) human language?
2. In what concrete ways has this issue been addressed or solved and what specific ideas have been proposed to address this issue?
3. How has/might this issue or its (proposed) solutions impact human society, now or in the future? What specific emotional, political, or social responses have emerged because of this issue or its (proposed) solutions/enhancements?

4. How has this issue or challenge impacted yourself or someone who you know? How has your understanding of this issue changed since learning more about it? How might this change your actions or responses to this or similar issues in the future?

Partial or full plagiarism will result in a 0 score for the assignment and may result in 0 for the class. Never copy writing and submit it as your own intellectual property, even from a computer! AI tools should be used to spur creativity, improve logical organization and style, or check spelling and grammar. If you have *any doubts* whether you are crossing the line into plagiarism, consult with the instructors!

Grading Scale

For more information: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

A	94 – 100%	B	84 – 86%	C	74 – 76%	D	64 – 66%
A-	90 – 93%	B-	80 – 83%	C-	70 – 73%	D-	60 – 63%
B+	87 – 89%	C+	77 – 79%	D+	67 – 69%	E	<60

Rubrics

Writing Assessment Rubric (drafts & final version WR)

	SATISFACTORY (Y)	UNSATISFACTORY (N)
CONTENT	Exhibits evidence of complex ideas that respond to all four prompts. Provides adequate discussion with basic understanding of topic and sources. Critically synthesizes at least 3 appropriate sources.	Central idea that is unclear, unfocused, or not directly and clearly related to the topic of the class, or provides minimal or inadequate discussion of ideas. Lacks sufficient or appropriate cited sources.
ORGANIZATION AND COHERENCE	Exhibits clearly identifiable structure, including a clear central idea, clear statement of the main topic and clear thesis statements that are related to each prompt and thesis sentences for every paragraph. At the weak end of Satisfactory, it may require readers to work to follow progression of ideas.	Either the whole essay or some of the paragraphs lack clearly identifiable organization. May lack coherent sense of logic for association of ideas and their organization. May lack transitions to guide reader.
ARGUMENT AND SUPPORT	Uses persuasive and confident presentation of ideas, strongly supported with evidence/examples and citations that support the ideas. At the weak end, may provide only generalized discussion of ideas, or provides adequate discussion but relies on weak support or poorly chosen examples.	Makes only weak generalizations, providing little or no support. For example, paragraphs are summaries or illustrations without a critical analysis or clear connection to central idea, or contain no evidence or examples.
STYLE*	Uses a writing style and word choice appropriate to the context, genre, and chosen style. Sentences display complexity and logical structure. On the weak end, displays a less precise use of vocabulary and an uneven use of sentence structure or uses a writing style that occasionally veers in word choice or tone	Relies on writing style and word choice that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short or have awkward construction. Author may use words incorrectly

MECHANICS*	Features correct and error-free presentation of ideas. At the weak end of the Satisfactory, may contain word choice, punctuation, or grammatical errors that do not muddy the paper's argument or points but show evidence of over-dependence on language technology	Contains so many mechanical or grammatical errors that they impede the reader's understanding or severely undermine the writer's credibility
------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------

- The instructors will evaluate the writing requirement (WR) by this rubric and provide feedback.
- **WR grades have two components.** To receive writing requirement credit, a student **must receive a grade of C or higher on the course and a satisfactory completion of the writing component of the course.**

Rubric for Self-Reflections, Peer Reviews, & Activities

Points out of 5	High Quality 5/5	Average 4/5	Needs Improvement 1.5/5
Informed	Shows evidence of having done the assigned work		Does not show sufficient evidence of having done the whole assigned work
Thoughtful*	Shows evidence of having understood and considered issues raised		Does not show unambiguous evidence of having engaged with or considered issues raised
Style & Mechanics	If applicable, satisfies the writing rubric in these two areas		Does not completely fulfill the writing rubric in these areas

- Online and in-person participation activities are evaluated for thoughtfulness, or S/U for completion only, or for correctness if auto-graded, unless stated otherwise in the instructions.

III. Annotated Weekly Schedule

Module	Week	Topics, Homework, and Assignments	Required Readings	Assignments
Orientation & 1 Introduction	Week 1 1/13	Topic: What is Language? What is Computer? Summary: We're studying human language. Binary numbering system is the computers' language. Bits and bytes are its units of information.	Syllabus & LaC section 1.1 start section 1.4 (read all of 1.4.1-1.4.2)	
	Week 2 1/21	Topic: Can Computers "Read" Any Language? Summary: Writing is a representation of language. Computers represent writing with Unicode.	LaC section 1.2-1.4 & "Under the Hood 1" (pp. 2-18, 22-25) "Writing_Requirements"	
2 Text and Speech	Week 3 1/27	Module 2: Speech and Text Topic: Can Computers "Hear" Any Language? Summary: Computers connect speech with writing and writing with speech. Computers can't always understand your neighbors.	LaC section 1.5 thru 1.6 (pp. 25-30, 34-36)	Homework 1

Module	Week	Topics, Homework, and Assignments	Required Readings	Assignments
3 Writing Aids	Week 4 2/3	Topic: How do Computers Learn to Spell? Summary: Humans make various kinds of spelling errors. Spellcheckers must identify them, then generate corrections.	LaC section 2.1 thru 2.3 (pp. 41-47, 49-52) "Guide to Essay Writing"	
	Week 5 2/10	Topic: How does Language Become Math? Summary: Probability and statistics help computers "understand" language and rank spelling and grammar corrections. N-grams are the name of the AI game.	LaC section 2.4 (pp. 58-65) & "Under the Hood 8" (pp. 175-178)	Homework 2
	Week 6 2/17	Topic: How do Computers Learn Grammar? Summary: Languages are systems of structures and computers must handle these systems somehow.	LaC section 2.5-2.8 except 2.5.3 (pp. 65-71 & 74-75, 78-83)	
Communicating Information	Week 7 2/24	Topic: Can Computers Teach Languages? Summary: Computer-aided language learning systems must process basic language structures to give an effective experience.	LaC section 3.1-3.5, 3.7-3.9 (pp. 91-113, 115-124)	Homework 3
	Week 8 3/3	Topic: Do Computers have Good Conversations? Summary: Conversations operate on the Cooperative Principles.	LaC Chapter 8 (pp. 285-321)	
	Week 9 3/10	Topic: How does Google Know What You Want? Summary: Search engines need to handle structured and unstructured language data.	LaC sections 6.1-6.3, 6.5-6.7 not including 6.5.1 (pp. 197-206, 217-218, 226-237)	Homework 4
BREAK				
Classifying Language	Week 10 3/24	Topic: Can Language Solve Crimes? Summary: We can recognize the author of a document based on the statistical patterns of words.	LaC sections 4.1, "Under the Hood 7", 4.3, 4.5 (pp. 127-139, 141-150, 156-157)	
	Week 11 3/31	Topic: How do Computers Learn? Summary: Machine learning is the main engine of AI. It helps fill your spam folder, recognize emotion, and solves crimes.	LaC sections 5.1-5.3, 5.5-5.8 (pp. 161-166, 172-174, 178-189, 190-192)	Homework 5
	Week 12 4/7	Topic: Can Computers be Polyglots? Summary: Translation is important but hard. Multilingual computers may not be possible.	LaC Chapter 7 (pp. 245-275) <i>Skim 7.2-7.3, 7.4.2, 7.4.5</i>	Writing Requirement due!

Module	Week	Topics, Homework, and Assignments	Required Readings	Assignments
Computers in a Multilingual World	Week 13 4/14	Topic: Does Language Technology Kill Languages? Summary: Many languages are disappearing. Technology might help preserve languages or it might speed language death.	Reading on Canvas	
	Week 14 4/21	Topic: How will Language Technology Influence My Future? Summary: The nature and quality of our lives may change because of language technology.	LaC Chapter 9 (pp. 325-329)	Homework 6
Future Impact	Week 15			FINAL EXAM

IV. Student Learning Outcomes (SLOs)

At the end of this course, students will be expected to have achieved the [Quest](#) and [General Education](#) learning outcomes as follows:

- **Content:** *Students demonstrate competence in the terminology, concepts, theories and methodologies. They identify, describe, and explain key themes, principles, and terminology; the history, theory and/or methodologies used; and social institutions, structures and processes within the discipline(s).*
 - Identify, describe and explain key theoretical terms and concepts that apply to languages around the world and the communities that speak them: syntax, morphology, written language, language endangerment, principles and politics of translation (**S**)
 - Identify and understand key structures and terms in computer science sufficiently well to explain how computers are able to store, represent, and process written and spoken data, e.g. Unicode, binary, classification, machine learning algorithms (**S, Quest 2**)
 - Identify endangered languages around the world and in the U.S.; explain how languages become endangered and why minority language communities remain under-served by technology (**Quest 2**)

Assessments: Exams, quizzes

- **Critical Thinking:** *Students carefully and logically analyze information from multiple perspectives and develop reasoned solutions to problems within the discipline(s). They apply formal and informal qualitative or quantitative analysis effectively to examine the processes and means by which individuals make personal and group decisions. Assess and analyze ethical perspectives in individual and societal decisions.*
 - Analyze the theory and practice of human language technology, including the scientific, commercial, and social goals for which it can be applied (**S, Quest 2**)
 - Critically examine and evaluate how the limitations and ethical challenges of the language technology may impact a speech community's educational, economic, and political involvement (**S, Quest 2**)
 - Evaluate the capabilities of a specific language technology system for processing a specific language or language variety, linguistic structure, or writing system used by a community around the world or in the U.S. (**Quest 2**)

Assessments: participation exercises, homeworks

- **Communication:** *Students communicate knowledge, ideas and reasoning clearly and effectively in written and oral forms appropriate to the discipline(s).*
 - Identify and explain in writing at least one current issue at the intersection of technology, language, and social science using concepts, terms, and ideas covered in this course (**S, Quest 2**)
 - Develop and analytically support one's own conclusions, and critically assess others' opinions, about the design, capabilities and behavior of human language and the technology that stores, represents, and processes languages (**S, Quest 2**)

Assessments: writing requirement, homeworks

- **Connection:** *Students connect course content with meaningful critical reflection on their intellectual, personal, and professional development at UF and beyond.*

- Connect the structures and concepts that are “under the hood” in language technology to other technology regularly encountered in adult and professional life (**Quest 2**)
- Reflect on social and ethical considerations related to language technologies and connect them to broader societal issues, such as privacy, equity, and the nature of artificial intelligence (**Quest 2**)
- Compare ways that technology can increase the threat to and also help maintain languages spoken by under-resourced communities around the world and in the U.S. (**Quest 2**)

Assessments: participation exercises, homeworks, writing requirement

Social Science courses must afford students an understanding of the basic social and behavioral science concepts and principles used in the analysis of behavior and past and present social, political, and economic issues. **Social and Behavioral Sciences** is a sub-designation of Social Sciences at the University of Florida. Social and behavioral science courses provide instruction in the history, key themes, principles, terminology, and underlying theory or methodologies used in the social and behavioral sciences. Students will learn to identify, describe and explain social institutions, structures or processes. These courses emphasize the effective application of accepted problem-solving techniques. Students will apply formal and informal qualitative or quantitative analysis to examine the processes and means by which individuals make personal and group decisions, as well as the evaluation of opinions, outcomes or human behavior. Students are expected to assess and analyze ethical perspectives in individual and societal decisions.

V. Quest Learning Experiences

1. Details of Experiential Learning Component

Social Science Fieldwork: Experiential learning connects the concepts, history, themes, and terminology covered by lectures and readings to concrete applications, or to related issues or skills that students encounter regularly in our lives. This includes fieldwork. Social science fieldwork can involve interviewing a target group about an artifact or phenomenon being studied. Two activities guide the students to conduct interviews or conduct field testing with users such as are conducted in technology fields that integrate social sciences, such as user experience design and research (UXD/UXR). These activities allow students to explore and apply content about society, language, and AI away from the institution and in direct contact with the people and concrete examples of language technology discussed in class. For example, after learning how computers encode spoken language, students will interview users of a voice recognition system such as Amazon Alexa to see firsthand how well the tool can represent a range of accents.

2. Details of Self-Reflection Component

Self-reflections on learning experiences are integrated into the homework assignments and the Friday sessions. Students will reflect on their learning process in writing and in group discussions. Prompts will guide students to deepen their connection to their experiential learning activities. For example, after seeing firsthand how easily speech recognition “breaks” for users, students will discuss how the AI trained on a limited variety of voices might impact everyday experiences of non-native or “non-standard” speakers.

The writing requirement also prompts students to reflect on and communicate their own and others' feelings and reactions towards the design, capabilities, and behavior of human languages and the technology that processes them. Students should consider content from readings and lectures and explore social media or personal connections and examine social and ethical implications as they develop their essay topic.

VI. Required Policies

Attendance Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Students Requiring Accommodation

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, *as early as possible*.

UF Evaluations Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Student Honor Code. On all work submitted for credit by Students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The [Student Honor Code and Conduct Code](#) (Regulation 4.040) specifies a number of behaviors that are in violation of this code, as well as the process for reported allegations and sanctions that may be implemented. All potential violations of the code will be reported to Student Conduct and Conflict Resolution. If a student is found responsible for an Honor Code violation in this course, the instructor will enter a Grade Adjustment sanction which may be up to or including failure of the course. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Religious Observances

A student should inform the instructor if the religious observances of their faith will conflict with class attendance, tests or examinations, or other class activities. This should be done prior to the class or occurrence of that test or activity. We are obligated (and happy) to accommodate the student's religious observances.

Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: <http://www.counseling.ufl.edu/>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Collegial Environment

Students are encouraged to employ critical thinking and to rely on data and verifiable sources to interrogate all assigned readings and subject matter as a way of determining whether they agree with their classmates and/or

their instructor. No lesson is intended to espouse, promote, advance, inculcate, or compel a particular feeling, perception, viewpoint or belief. Students are encouraged to share their viewpoints, data, and sources in class and to speak with the instructor or classmates, in class or privately, about any perceived violation of this policy.

In-Class Recordings

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is defined as an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission by the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.