LT5434: COMPUTATIONAL PSYCHO/ NEUROLINGUISTICS

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
Computational Psycho/Neurolinguistics

Subject Code
LT - Linguistics and Translation
Course Number
5434

Academic Unit
Linguistics and Translation (LT)

College/School
College of Liberal Arts and Social Sciences (CH)

Course Duration
One Semester

Credit Units
3

Level
P5, P6 - Postgraduate Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course explores the intersection of computational modeling, psycholinguistics, and neuroscience. It introduces students to the use of computational algorithms - ranging from probabilistic models to modern neural networks and Large Language Models (LLMs) - to simulate human language processing and representation. Students will examine how computational models can generate predictions about human reading times, eye-movements, and neural activation patterns. The course emphasizes the critical evaluation of "cognitive plausibility" in AI systems and provides hands-on experience in using computational tools to investigate research questions in language cognition.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain core architectures of computational models used in psycholinguistics.		x	x	x
2	Implement or apply basic computational models to simulate specific linguistic phenomena.		x	x	x
3	Evaluate the cognitive plausibility of computational models by comparing their outputs with human behavioral and neural data.		x	x	x
4	Formulate research-informed arguments regarding the relationship between Artificial Intelligence and human language faculties.		x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Reading	Students will read academic papers and book chapters on cognitive modeling, neural network architectures, and the comparison of AI vs human processing.	1, 2, 3, 4	3 hours
2	Lecture	Students will attend lectures covering theoretical foundations of computational psycholinguistics, information theory, and vector semantics.	1, 2, 3, 4	3 hours

3	Practical activities	Students will participate in hands-on sessions involving the use of modeling toolkits, analysis of corpus data, and comparison of model predictions with human datasets.	1, 2, 3, 4	3 hours

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Modeling project	1, 2, 3, 4	30	Students can use GenAI tools to brainstorm, gather information, solve problems, format references, and edit language. Students should give proper acknowledgment to all the content from GenAI tools that they incorporated into the assignment and keep a journal of their GenAI conversations. Students should not present texts generated or translated by GenAI tools as their own original work.	Yes

2	Critical research paper	1, 2, 3, 4	30	Students can use GenAI tools to brainstorm, gather information, solve problems, format references, and edit language. Students should give proper acknowledgment to all the content from GenAI tools that they incorporated into the assignment and keep a journal of their GenAI conversations. Students should not present texts generated or translated by GenAI tools as their own original work.	Yes
3	End-of-term test	1, 2, 3, 4	40	-	No

Continuous Assessment (%)

100

Assessment Rubrics (AR)

Assessment Task

Modeling project

Criterion

Demonstrate the ability to implement or apply a computational model to a linguistic problem, analyze the model’s output, and compare it against human baseline data.

Excellent (A+, A, A-)

Demonstrate strong evidence of capacity to apply computational tools; superior analysis of model performance; and evidence of excellent understanding of the link between model parameters and cognitive theories.

Good (B+, B, B-)

Demonstrate good evidence of capacity to apply computational tools; correct interpretation of model output; and evidence of good understanding of cognitive modeling principles.

Fair (C+, C, C-)

Demonstrate some evidence of ability to use tools; adequate interpretation of basic results; and partial understanding of the modeling task.

Marginal (D)

Demonstrate limited evidence of ability to use tools; minimal or incorrect interpretation of results; and only basic awareness of the model’s function.

Failure (F)

Demonstrate inadequate ability to apply tools; failure to generate meaningful results; or show substantial inaccuracies in interpretation.

Assessment Task

Critical research paper

Criterion

Demonstrate the ability to critically discuss the theoretical implications of computational models for psycholinguistics/neurolinguistics, supporting arguments with empirical evidence.

Excellent (A+, A, A-)

Demonstrate strong evidence of excellent ability through writing to critically discuss fundamental issues in computational cognition; integrate computational and experimental evidence effectively.

Good (B+, B, B-)

Demonstrate evidence of good ability through writing to discuss fundamental issues in computational cognition; present coherent arguments linking models to human processing.

Fair (C+, C, C-)

Demonstrate adequate ability through writing to discuss basic issues in computational psycholinguistics.

Marginal (D)

Demonstrate limited ability through writing to discuss issues in computational psycholinguistics; weak argumentation.

Failure (F)

Demonstrate no ability through writing to discuss fundamental issues in computational psycholinguistics.

Assessment Task

End-of-term test

Criterion

Demonstrate understanding of key computational architectures, information-theoretic concepts, and their application to neurolinguistic research.

Excellent (A+, A, A-)

Demonstrate excellent understanding of computational concepts and their application to linguistics; strong evidence of capacity to evaluate model predictions.

Good (B+, B, B-)

Demonstrate good understanding of computational concepts and their application; some evidence of capacity to evaluate model predictions.

Fair (C+, C, C-)

Demonstrate adequate understanding of basic computational concepts and their relevance to linguistics.

Marginal (D)

Demonstrate limited understanding of computational concepts; minimal awareness of their relevance.

Failure (F)

Demonstrate no understanding of basic computational concepts or their application to linguistics.

Part III Other Information

Keyword Syllabus

Computational modeling of cognition; Connectionism and Neural Networks; Distributional Semantics and Word Embeddings; Information Theory; Large Language Models (LLMs) as cognitive models; Probabilistic parsing; Modeling reading times and eye-movements; Decoding neural states (fMRI/EEG) using computational models; Cognitive plausibility; Artificial Intelligence vs Human Intelligence.

Reading List

Compulsory Readings

	Title
1	Lecture notes/slides/readings for the course.
2	Crocker, M. W. (2012). Computational psycholinguistics: An interdisciplinary approach to the study of language (Vol. 20). Springer Science & Business Media.

Additional Readings

	Title
1	Baggio, G. (2022). Neurolinguistics. MIT Press.