LT5433: EEG FOR RESEARCH IN LINGUISTICS

Effective Term
Semester A 2026/27

Part I Course Overview

Course Title
EEG for Research in Linguistics

Subject Code
LT - Linguistics and Translation
Course Number
5433

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 provides a theoretical and practical introduction to Electroencephalography (EEG) as a tool for linguistic research. It covers the neurophysiological origins of EEG signals, the logic of Event-Related Potentials (ERPs), and the time-frequency

analysis of neural oscillations. Uniquely, this course includes a substantial hands-on component: students will learn to set up EEG equipment, apply electrodes, and collect high-quality data from human participants. Students will also gain practical experience in preprocessing data (artifact rejection, filtering) and analyzing standard linguistic components (e.g., N400, P600) using specialized software.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the neural origins of the EEG signal and the theoretical basis of major linguistic ERP components (N400, P600, LAN).		x	x	x
2	Design a feasible EEG experiment to investigate a specific phonological, syntactic, or semantic research question.		x	x	x
3	Demonstrate competence in practical data collection, including electrode application, impedance reduction, and artifact minimization.		x	x	x
4	Implement standard preprocessing and analysis pipelines for both Event-Related Potentials (ERPs) and time-frequency data.		x	x	x
5	Interpret EEG results in relation to cognitive models of language processing.		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 textbook chapters on ERP technique and neural time series analysis, along with primary research articles.	1, 2, 3, 4, 5	
2	Lectures	Students will attend lectures covering the biophysics of EEG, experimental design for ERPs, and the functional significance of linguistic components.	1, 2, 3, 4, 5	

3	Lab Practicals	Students will participate in hands-on sessions in the laboratory to practice capping, gelling, data acquisition, and software-based analysis.	1, 2, 3, 4, 5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Practical Lab Assignments: Hands-on assessment of data collection competencies (e.g., impedance check, capping speed) and data preprocessing tasks. (15% x 3)	1, 2, 3, 4, 5	45	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	Research Report: A written report detailing the design, analysis, and interpretation of a pilot EEG dataset.	1, 2, 3, 4, 5	15	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

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Assessment Rubrics (AR)

Assessment Task

Practical Lab Assignments:
Hands-on assessment of data collection competencies (e.g., impedance check, capping speed) and data preprocessing tasks. (15% x 3)

Criterion

Demonstrate technical competence in the EEG laboratory workflow: Correct electrode application; Signal quality verification; Execution of preprocessing steps.

Excellent (A+, A, A-)

Excellent technical skill; rapid and accurate capping; superior signal quality; flawless execution of analysis pipeline.

Good (B+, B, B-)

Good technical skill; acceptable capping speed and impedance; correct execution of main analysis steps.

Fair (C+, C, C-)

Adequate technical skill; some difficulty with signal acquisition or software steps but able to complete the task.

Marginal (D)

Marginal technical skill; poor signal quality or significant errors in preprocessing.

Failure (F)
No capability to collect or analyze EEG data; safety violations in lab.

Assessment Task
Research Report:
A written report detailing the design, analysis, and interpretation of a pilot EEG dataset.

Criterion
Demonstrate ability to report EEG methods and results: Clear description of paradigm; Correct visualization of waveforms/ topoplots; Theoretical interpretation of components.

Excellent (A+, A, A-)
Excellent reporting of methods; professional-quality figures; insightful theoretical interpretation of neural data.

Good (B+, B, B-)
Good reporting of methods; clear figures; correct interpretation of standard components.

Fair (C+, C, C-)
Adequate reporting; basic figures; some confusion in interpreting components.

Marginal (D)
Marginal reporting; unclear figures; weak interpretation.

Failure (F)
Inadequate reporting; failure to present results; no interpretation.

Assessment Task
Examination

Criterion
Demonstrate understanding of EEG theory and design (under time constraints): Explain neural generators; Predict component morphology (e.g., N400 vs P600) based on linguistic stimuli.

Excellent (A+, A, A-)
Excellent understanding of neurophysiology and linguistic ERPs; strong ability to predict and explain neural responses.

Good (B+, B, B-)
Good understanding of basic components; ability to link stimuli to likely ERP outcomes.

Fair (C+, C, C-)
Adequate understanding of major components; basic definition of terms.

Marginal (D)
Marginal understanding; confusion between components or polarity.

Failure (F)
No understanding of EEG/ERP concepts.

Part III Other Information

Keyword Syllabus

Electroencephalography (EEG); Event-Related Potentials (ERPs); Neural generators; Post-synaptic potentials; Reference electrodes; Artifact rejection; Independent Component Analysis (ICA); Averaging; Filtering; Time-Frequency Analysis; N400 (Semantic anomalies); P600 (Syntactic anomalies); MMN (Mismatch Negativity); Lateralized Readiness Potential (LRP).

Reading List

Compulsory Readings

	Title
1	Lecture notes/slides/readings for the course.
2	Luck, S. J. (2014). An introduction to the event-related potential technique. MIT press.

Additional Readings

	Title
1	Cohen, M. X. (2014). Analyzing neural time series data: theory and practice. MIT press.