

Computational Analysis of Language Certificate Types 1b (CAOL1B-CR) & 2 (CAOL2-CR)

Coordinating Advisors

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This 12 credit-hour undergraduate certificate will train students in basic concepts and methods of computational linguistics. It will introduce students to various tasks involved when computers process human speech and text, including speech recognition, text-to-speech conversion, machine translation (automatic translation of text from one human language to another), automated text analysis (e.g. question detection), and natural language generation (e.g. converting data tables into human language). Since computational linguistics is at the intersection of computer science and linguistics, the certificate will give students a basic understanding of both domains. The certificate is designed for current undergraduate students from any major who want to pursue a career related to the creation of language technologies, as well as for professionals in a related area who want to enhance their marketability.

At least 12 credit hours, excluding prerequisites will lead to Certificate in Computational Analysis of Language.

The certificate program must be approved by the Undergraduate Programs Advisor in the Linguistics Department.

The certificate is divided into two tracks, reflecting different kinds of preparation for a career in language technologies.

TRACK A

Track A introduces students to issues and methods in computational linguistics at a conceptual but mostly not a technical level and does not require computer programming, although students can *choose* to do coursework that involves computer programming. This track will prepare students for industry work as Language Specialists, Data Specialists, Localization Specialists, Speech Data Evaluators, Voice User Interface Designers, Language Annotators, and for similar entry-level positions. These jobs generally require a Bachelor's degree in linguistics, a world language, English, or other relevant field. This track is designed to provide students from any background a basic knowledge of the computational analysis of language data, which students can pair with a BA or BS degree in various fields.

No prior knowledge of computer programming is required for courses in Track A.

Coursework (5 courses (1 prerequisite + 4 core courses))

- A. Prerequisite: Ling 2000(H) or English 3271 (3 credits)
B. Four Core courses (3 credit hours each), as follows:
1. One course on linguistic analysis
 - a. Ling 2001: Language and Formal Reasoning
 - b. Ling 4100: Phonetics
 - c. Ling 4200: Syntax
 - d. Ling 4300: Phonology
 - e. Ling 4350: Morphology
 - f. Ling 4400: Linguistic Meaning
 2. Introduction to human language technology (core course):
 - a. Ling 3802(H): Language and Computers
 3. One language and technology elective:
 - a. Ling 3801: Code Making and Code Breaking
 - b. Ling 3803: Ethics of Language Technology
 4. One course on methods and tools for computational analysis of language:
 - a. Ling 2051(H): Analyzing the Sounds of Language
 - i. Note: Despite the 2000-level number, this course requires students to use R functions for statistical analysis of language data
 - b. Ling 5050: Technical Tools for Linguists
 - c. English/Ling 5804: Analyzing Language in Social Media

TRACK B

Track B introduces students to issues and methods in computational linguistics at both a conceptual and a technical level and requires basic computer programming, which can be developed through certificate coursework. This track is designed primarily to prepare students for an MS or PhD program in computational linguistics. Admission to these graduate programs requires at least a basic background in (1) linguistics; (2) programming and computer science; and (3) probability, statistics, and formal logic. Track B is designed primarily for students who are pursuing a degree or otherwise have a background in one of these areas but not all three. The certificate will help them bridge the gap between their background and these programs' admissions requirements, while at the same time allowing students to tailor their coursework to their particular needs. This track is designed to lead ultimately to industry positions, for example as a Computational Linguist, Language Engineer, Data Scientist, Analytical Linguist (a kind of data scientist), NLP Scientist, Human Language Technologist, or Research Scientist.

Consult with the Undergraduate Advisor in Linguistics to determine and seek approval for coursework required to complete the certificate.

Coursework (5 courses (1 prerequisite + 4 core courses))

- A. Prerequisite: Ling 2000(H) or English 3271 (3 credits)
B. Four Core courses (3 credit hours each), as follows:
1. One course on linguistic analysis or introduction to human language technology:
 - a. Ling 3802(H): Language and Computers
 - b. Ling 3803: Ethics of Language Technology
 - c. Ling 4100: Phonetics
 - d. Ling 4200: Syntax
 - e. Ling 4300: Phonology
 - f. Ling 4350: Morphology
 - g. Ling 4400: Linguistic Meaning
 2. Introduction to computational linguistics (core course):
 - a. Ling 5801: Computational Linguistics 1
 3. One upper-division course on computational linguistics methods and tools:
 - a. Ling 5050: Technical Tools for Linguists*
 - b. Ling 5802: Computational Linguistics 2
 - c. Ling 5803: Computational Semantics
 - d. English/Ling 5804: Analyzing Language in Social Media
 - e. CSE 3521: Survey of Artificial Intelligence 1
 - f. CSE 5525: Foundations of Speech and Language Processing
 4. One additional course from either 1. or 3.

*For students without a background in computer programming, this course (or another introduction to computer programming) is strongly recommended prior to taking Ling 5801.

Certificate in Computational Linguistics program guidelines

The following guidelines govern the Certificate in Computational Linguistics.

Credit hour required: Minimum of 12 credits.

Overlap with courses in degree

- The certificate must be in a different subject than the major.
- Max 50% overlap with major, minor, other certificate, or GE.

Grades required

- Minimum C- for a course to be counted on the certificate.
- Minimum 2.00 cumulative point-hour ratio required for the certificate.

X193 credits: Not permitted.

Approval Required: The certificate program must be approved by the Undergraduate Programs Advisor in the Linguistics Department.

Consult with the Linguistics Advisor for filing deadlines, and for changes or exceptions to the certificate.

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