

# 1Syllabus: LING 131

## Algorithms for Computational Linguistics

### Course Description

This is an undergraduate- and introductory graduate-level course on the computational properties of natural languages and the fundamental algorithms for processing natural languages. The two main objectives of the course are:

- To develop a thorough understanding of the principles and formal methods used in the design and analysis of language processing algorithms, and
- To provide an in-depth presentation of the major algorithms used in Natural Language Processing (NLP), including Lexical, Morphological, Syntactic, and Semantic analysis, with the primary focus on various parsing algorithms and their analysis.

This course is a recommended elective for the undergraduate major and minor in Language and Linguistics. The course is designed to help Linguistics students acquire programming skills that allow manipulation of large amounts of linguistic data, a skill necessary for conducting linguistic analysis with a broad empirical basis. The course is required for students with no Computer Science background, and an elective for students with Computer Science background, in the newly approved BA/MA and Two-Year MA Programs in Computational Linguistics.

### Course Content

- Week 1: Introduction
- Weeks: 2-5: Python programming
- Weeks 6-7: Algorithms for lexical and morphological analysis in NLP
- Weeks 8-11: Parsing and other algorithms for syntactic analysis in NLP
- Weeks 12-13: Semantic analysis, course wrap-up

### Required Reading

Natural language Toolkit: an online book can be read or downloaded from the Internet at <http://www.nltk.org/book>. It's used for readings and tutorials.

### Recommended Reading

- *Representation and Inference for Natural Language: A First Course in Computational Semantics*, 2005, CSLI Stanford, Patrick Blackburn and Johan Bos.
- *The Oxford Handbook of Computational Linguistics* (Oxford Handbooks in Linguistics) Ruslan Mitkov (ed.) Oxford University Press, 2005.

### Prerequisites

The prerequisite for this course is LING 100a.

### Grading

- 55%: regular exercises and projects
- 20%: midterm
- 25%: final exam