

Natural Language Processing	Code & No:	CS 463
	Credits:	3 (3, 1, 0)
	Pre-requisite:	CS270
	Co-requisite:	None
	Level:	9 or 10

Course Description: Natural Language Processing addresses fundamental questions at the intersection of human languages and computer science. How can computers acquire, comprehend and produce English? How can computational methods give us insight into observed human language phenomena? In this interdisciplinary introductory course, you will learn how computers can do useful things with human languages, such as translation between different languages, filter junk email, and find the main topics in the day's news. The intent of the course is to present a fairly broad graduate-level introduction to Natural Language Processing (NLP, a.k.a. computational linguistics), the study of computing systems that can process, understand, or communicate in human language. The primary focus of the course will be on understanding various NLP tasks as listed on the course syllabus, algorithms for effectively solving these problems, and methods for evaluating their performance.

Course Aims:

- 1) Learning algorithms that train on (annotated) text corpora to automatically acquire the knowledge needed to perform the task. Study main NLP algorithms
- 2) This course will examine NLP, with an emphasis on how well the algorithms work and how they can be used (or not) in applications.

Course Learning Outcomes (CLOs):

1. Learn major NLP issues and solutions
2. Apply programming techniques to implement NLP algorithms
3. Assess NLP problems and find proper solutions

No.	Topics	Weeks	Teaching hours
1	Introduction and Overview	1	3
2	Regular Expressions	1	3
3	String Edit Distance and Alignment	2	6
4	Context Free Grammars	1	3
5	Probability Theory	1	3
6	Language modeling and Naive Bayes	2	6
7	Part of Speech Tagging and Hidden Markov Models	2	6
8	Probabilistic Context Free Grammars, Parsing with PCFGs	2	6
9	Maximum Entropy Classifiers	1	3
10	Machine Translation	1	3
Total		14	42

Textbook:

- Jurafsky and Martin, "SPEECH and LANGUAGE PROCESSING: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition", Second Edition, McGraw Hill, 2008.

Essential References:

- Manning and Schütze, "Statistical Natural Language Processing", MIT Press; 1st edition (June 18, 1999), ISBN: 0262133601