

Natural Language Processing

Course Administration & Presentation

Master Degree in Computer Engineering
University of Padua
Lecturer : Giorgio Satta

<https://stem.elearning.unipd.it/course/view.php?id=7937>

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Class hours

Thurs 12:30–14:30, **under email appointment**

Building: DEI/G, fourth floor

Zoom meeting: <https://unipd.zoom.us/j/82934199797>

Schedule

	Wed	Thurs	Fri
10:30–11:30	room Me		room De
11:30–12:30	room Me		room De
12:30–13:30		office hours	
13:30–14:30		office hours	

Content outline

LECTURE	WEEK	TOPIC	BOOK & CHAPTERS
PRELIMINARIES			
1	1	Natural language processing: Introduction	Introduction to Natural Language Processing, Eisenstein, Chapter 1 Speech and Language Processing, Jurafsky and Martin, Chapter 1
2	1	Essentials of linguistics	Slides from the lecture
3	2	Text normalization	Speech and Language Processing, Jurafsky and Martin, Chapter 2
LARGE LANGUAGE MODELS			
4	2, 3	Word embeddings	Speech and Language Processing, Jurafsky and Martin, Chapter 6 Introduction to Natural Language Processing, Eisenstein, Chapter 14
5	3, 4	Language models	Speech and Language Processing, Jurafsky and Martin, Chapters 3, 7,
6	4, 5	Large language models	Speech and Language Processing, Jurafsky and Martin, Chapters 10, 11
6-aux	5	ChatBot	Slides from the lecture
STRUCTURED PREDICTION			
7	5, 6	Part-of-Speech Tagging	Speech and Language Processing, Jurafsky and Martin, Chapter 8 Introduction to Natural Language Processing, Eisenstein, Chapter 7
8	6	Phrase-Structure Parsing (part I)	Speech and Language Processing, Jurafsky and Martin, Chapter 17
9	7	Phrase-Structure Parsing (part II)	Speech and Language Processing, Jurafsky and Martin, Chapter 17
10	8	Dependency Parsing	Speech and Language Processing, Jurafsky and Martin, Chapter 18
11	9	Semantic Parsing	Speech and Language Processing, Jurafsky and Martin, Chapter 20
END-TO-END APPLICATIONS			
12	9, 10	Machine Translation	Speech and Language Processing, Jurafsky and Martin, Chapter 13
13	11	Question Answering	Speech and Language Processing, Jurafsky and Martin, Chapter 14 Introduction to Natural Language Processing, Eisenstein, Chapter 17
14	11, 12	Dialogue Systems	Speech and Language Processing, Jurafsky and Martin, Chapter 15
CONCLUSIONS			
15	12	Wrap-up	Slides from the lecture

Lab sessions

SESSION	WEEK	TASK	MODEL
1	4	Word embedding	Skip-gram
2	5	Fine-tuning	Bert
3	8	Dependency parsing	Recurrent neural network
4	9	Text generation	Transformer

Course requirements

Students should have **basic knowledge** of the following subjects

- calculus + linear algebra
- machine learning + deep learning
- probability theory + information theory
- computer algorithms + dynamic programming
- automata theory + rewriting grammars + formal languages
- Python + NumPy + PyTorch

The class also uses basic knowledge from **linguistics**: all of the working notions in linguistics will be properly introduced.

Speech and Language Processing (3rd ed., draft)

Dan Jurafsky and James H. Martin

January 7, 2023

<https://web.stanford.edu/~jurafsky/slp3/>

Several chapters about machine learning, these will be given for granted.

Additional textbooks, for **consultation only**:

Introduction to Natural Language Processing

Jacob Eisenstein

MIT Press, October 2019

Natural Language Processing A Machine Learning Perspective

Yue Zhang and Zhiyang Teng

Cambridge University Press, January 2021

Additional material and resources available through **moodle page** of the class

- slides, videos and notebooks
- three forums for class, lab, and project discussion

Paper presentation:

- choose a scientific article from a given list of 2023 NLP conferences
- read, understand, and record a short video presentation

NLP system:

- for the announced task/dataset, provide
 - exploratory data analysis
 - baseline
 - neural approach
 - result comparison with state-of-the-art (SotA) and discussion
- report your project in a notebook

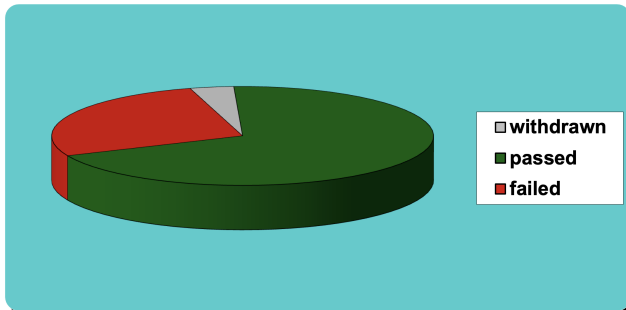
Written test	70%
Project	
1. NLP system	25%
2. article presentation	05%
	100%

Project groups of **maximum** two people.

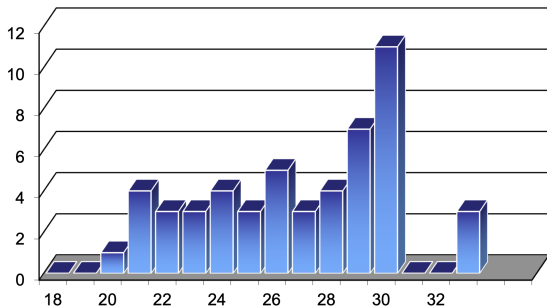
Project must be presented **before** earliest written test of the students in the group.

To pass the final exam you need to score 18/30 or above **for both** the written test and the project.

Academic year 2022-23



Academic year 2022-23



Academic year 2022-23

	w/d	subm	fail	pass	acpt
30/06/2023	00	31	08	23	74%
21/07/2023	02	31	10	21	68%
20/09/2023	01	16	04	12	75%
21/02/2024	??	??	??	??	??%

Academic year 2022-23



Satisfaction



Teaching



Course Organization

