UCLouvain

linfo2263

2026

Computational Linguistics and Generative AI

5.00 credits	30.0 h + 15.0 h	Q1

Teacher(s)	Dupont Pierre ;
Language :	English > French-friendly
Place of the course	Louvain-la-Neuve
Prerequisites	Required : basic notions of algorithms as taught in course LINFO1103 Required : skills in probability and statistics as targeted in courses LBIR1212 or LEPL1109 Desirable : advanced notions of algorithms and data structures as targeted in course LINFO1121
Main themes	· Different levels of linguistic analysis · Probabilistic modeling of language (N-grams and Hidden Markov Models) · Part-of-speech tagging · Vector semantics and methods for vector word embeddings · Deep learning applied to natural language processing · Attention mechanisms and transformers · Question-answering systems and conversational agents · Applications in language engineering such as autocomplete software, automatic tagging, summarization, machine translation, information retrieval, and chatbots
Learning outcomes	**At the end of this learning unit, the student is able to :** At the end of this learning unit, the student is able to : Given the learning outcomes of the "Master in Computer Science and Engineering" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes: INFO1.1-3 INFO2.3-4 INFO5.4, INFO5.5 INFO6.1, INFO6.5 Given the learning outcomes of the "Master [120] in Computer Science" program, this course contributes to the development, acquisition and evaluation of the following learning outcomes: SINF1.M4 SINF2.3-4 SINF5.3, SINF5.4 SINF6.1, SINF6.5 Students completing successfully this course should be able to: · describe the fundamental concepts of natural language modeling; · master the methodology of using linguistic resources, in particular large scale corpora, possibly annotated or structured; · apply in a relevant way statistical language modeling techniques; · implement recent machine learning methods applied to language processing; · develop linguistic engineering applications. Students will have developed skills and operational methodology. In particular, they have developed their ability to: · integrate a multidisciplinary approach between computer science and linguistics, using wisely the terminology, tools and existing methods; · manage the time available to complete projects of medium size; · manipulate and exploit large amounts of data.

Evaluation methods	**Computation of the overall course grade** The projects are worth 30 % of the overall score for the course, 70 % for the final exam (closed-book). The projects **cannot** be implemented again in second session. The global project grade is fixed at the end of the semester and included as such in the overall score for the course in the second session. The final exam is, by default, a written exam (on paper or, when appropriate, on a computer). **Rules for student collaboration and use of external resources, including generative AIs** Collaborative studying among students is encouraged during project follow-up sessions and via an exchange forum on Moodle. Each student is expected to submit a personal solution to each project. The use of public resources (e.g. stackoverflow.com), including generative AIs (e.g. chatGPT) is permitted, as long as each (fragment of) code submitted by the student mentions **specifically** all the resources used. The distribution or exchange between students of (fragments of) code is not authorized by any means (GitHub, Facebook, Discord, etc.), even after the project deadlines. Failure to comply with these rules for any project will result in an overall grade of 0 for all projects. These rules are explained in detail during the first class (see course Moodle site).
Teaching methods	· Lectures · Practical projects implemented in Python on the *Inginious* platform.
Content	· Various levels of linguistic analysis · Probabilistic language modeling · Part-of-speech tagging · Vector semantics and word embeddings · Deep Learning applied to natural language processing · Question answering and conversational agents · Linguistic engineering applications such as automatic completion software, POS tagging, text summarization, machine translation, information retrieval and chatbots
Inline resources	moodle.uclouvain.be/course/view.php?id=1182
Bibliography	One recommended textbook - un ouvrage conseillé : · Speech and Language Processing, D. Jurafsky and J.H. Martin, Prentice Hall.
Other infos	**Strong prerequisites** · Good knowledge of python programming · Introductory knowledge in data strucures and algorithms (see LINFO1101 and LINFO1103 , or equivalent courses) **Additional prerequisites** · Basic knowledge in probability theory (e.g. conditional probability, probabilistic independence, Bayes rule, ... **Previous know-how** · Existing knowledge in machine learning is a plus but not a prerequisite
Faculty or entity in charge	INFO

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Data Science : Statistic	DATS2M	5		
Master [120] in Chemical and Materials Engineering	KIMA2M	5		
Master [120] in Civil Engineering	GCE2M	5		
Master [120] in Biomedical Engineering	GBIO2M	5		
Master [120] in Linguistics	LING2M	5		
Master [120] in Mechanical Engineering	MECA2M	5		
Master [120] in Electrical Engineering	ELEC2M	5		
Master [120] in Physical Engineering	FYAP2M	5		
Master [120] in Computer Science and Engineering	INFO2M	5		
Master [120] in Computer Science	SINF2M	5		
Master [120] in Electro-mechanical Engineering	ELME2M	5		
Master [120] in Data Science Engineering	DATE2M	5		
Master [120] in Data Science: Information Technology	DATI2M	5		
Master [120] in Energy Engineering	NRGY2M	5		