

1	<b>Course title</b>	Computational Linguistics
2	<b>Course number</b>	2201311
3	<b>Credit hours</b>	3
	<b>Contact hours (theory, practical)</b>	3
4	<b>Prerequisites/corequisites</b>	
5	<b>Program title</b>	
6	<b>Program code</b>	
7	<b>Awarding institution</b>	University of Jordan
8	<b>School</b>	School of Foreign Languages
9	<b>Department</b>	Department of English Language and Literature
10	<b>Level of course</b>	
11	<b>Year of study and semester (s)</b>	
12	<b>Final Qualification</b>	PhD
13	<b>Other department (s) involved in teaching the course</b>	--
14	<b>Language of Instruction</b>	English
15	<b>Teaching methodology</b>	<input checked="" type="checkbox"/> Blended <input checked="" type="checkbox"/> Online
16	<b>Electronic platform(s)</b>	<input checked="" type="checkbox"/> E-learning <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....
17	<b>Date of production/revision</b>	October 2023

**18 Course Instructor:**

Name:

Office number:

Phone number:

Email:

Office Hours:

**19 Other instructors:**

Name:

Office number:

Phone number:

Email:

Name:

Office number:

Phone number:

Email:

Name:

Office number:

Phone number:

Email:

Name:

Office number:

Phone number:

Email:

**20 Course Description:**

This course is an introduction to the field of computational linguistics. It covers the fundamental techniques which can be used to model linguistic phenomena computationally at the levels of morphology, syntax, semantics and pragmatics. Moreover, it educates the PhD student in the theory, technologies and applications of Computational Linguistics and Natural Language Processing (NLP). students will be taught how such techniques are implemented, evaluated and applied to natural language processing (NLP) tasks. An overview of the use of such techniques will be provided, along with an introduction to several applications (e.g., machine translation, sentiment analysis and dialogue systems).

**21 Course aims and outcomes:**

**A- Aims: (PLOs)**

1. Understand and apply computational techniques to the analysis of empirical phenomena in different areas of linguistics (morphology, phonology, semantics, syntax).
2. Characterize the computational properties and power of different aspects of our linguistic competence.
3. Introduce the fundamental techniques of natural language processing (NLP).
4. Develop an understanding of the possibilities and limitations of those techniques.
5. Understand the framework within which NLP continues to develop.
6. Develop practical skills for solving NLP problems.
7. Understand the computational properties of natural language and basic formalisms used in language technologies
8. Give a general high-level breadth in the area of Computational Linguistics and its related disciplines.
9. Carry out original in-depth research work on a problem in Computational Linguistics.

**B- Intended Learning Outcomes (ILOs):**

Upon successful completion of this course, students will be able to:

No.	Course Learning Outcomes	Program Outcomes										Assessment Tools									
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
1	Be familiar with all related terms and expressions in the field	X	X			X	X														X
2	Understand basic computational linguistics techniques.		X			X	X							X	X	X					X
3	understand basic computational linguistics techniques' limitations and current performance levels when applied to linguistic		X			X	X								X						

e- Syllabus

	research and to real-world tasks.																			
4	Know the computational linguistics techniques and how are they implemented, evaluated and applied to NLP tasks	X												X				X	X	X
5	Carry out original in-depth research work on a problem in Computational Linguistics.	X												X	X			X	X	X
6																				
7																				
8																				

22. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcomes	Teaching Methods*/p latform	Evaluation Methods**	References
1	1.1	Introduction Computers in linguistics and	1,2,3,5,6,7	Lecture- discussion; student participation	In-class tasks	Main textbook
	1.2	Computers in linguistics and Natural Language Processing	1,2,3,5,6,7	Lecture- discussion; student participation	In-class tasks	Main textbook

e- Syllabus

	1.3	The nature and use of text corpora	1,2,3,5,6,7	Lecture-discussion; student participation	In-class tasks	Main textbook
2	2.1	Regular expressions	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
	2.2	Pattern matching	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
	2.3	Corpus search and counting	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
3	3.1	Regular languages	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
	3.2	Finite-state automata	2, 5, 6,8, 9, 10	Lecture-discussion; student participation	In-class tasks	Main textbook
	3.3	Operations and closure properties Pumping Lemma	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
4	4.1	Finite-state linguistics	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
	4.2	Transducers	2, 5, 6,8	Lecture-discussion; student participation	In-class tasks	Main textbook
	4.3	Morphological analysis	2, 5, 6,8	Lecture-discussion;	In-class tasks	Main textbook

e- Syllabus

				student participation		
5	5.1	N-grams	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
	5.2	Language modeling	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
	5.3	Smoothing Evaluation	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
6	6.1	Part-of-Speech Tagging	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
	6.2	Word classes and tagsets Evaluation	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
	6.3	Rule-based and stochastic POS tagging	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
7	7.1	Further topics in sequence linguistics	5, 6, 7, 8, 9	Lecture- discussion; student participation	In-class tasks	Main textbook
	7.2	Maximum entropy models	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook
	7.3	Evaluation	5, 6, 7	Lecture- discussion; student participation	In-class tasks	Main textbook

e- Syllabus

8	8.1	Revision worksheet	1-10	Lecture-discussion; student participation	In-class tasks	Main textbook
	8.2	Midterm Exam				
	8.3	Answering the exam questions		Lecture-discussion; student participation	In-class tasks	Main textbook
9	9.1	Context-free languages	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	9.2	Syntactic ambiguity	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	9.3	Context-free grammars	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
10	10.1	Parsing Search and dynamic programming	5, 6, 7, 8	Lecture-discussion; student participation	In-class tasks	Main textbook
	10.2	Chart parsing (CKY, Earley)	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	10.3	Chunking Evaluation	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
11	11.1	Further topics in tree linguistics	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook

e- Syllabus

	11.2	Probabilistic context-free grammars	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	11.3	Statistical parsing	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
12	12.1	Meaning	5, 6, 7, 8, 9	Lecture-discussion; student participation	In-class tasks	Main textbook
	12.2	Some approaches and desiderata	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	12.3	Syntax-semantics interface Compositionality	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
13	13.1	Word meaning	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	13.2	Semantic ambiguity Semantic relations Semantic roles	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
	13.3	Semantic relations Semantic roles	5, 6, 7	Lecture-discussion; student participation	In-class tasks	Main textbook
14	14.1	Computational lexical semantics Relation Extraction	1-10	Lecture-discussion; student participation	In-class tasks	Main textbook
	14.2	Relation Extraction Algorithms	1-10	Lecture-discussion;	In-class tasks	Main textbook



e- Syllabus

				student participation		
	14.3	Extracting Events Template Filling	1-10	Lecture- discussion; student participation	In-class tasks	Main textbook
15	15.1	Revision	1-10	Lecture- discussion; student participation	Discussion	Main textbook
	15.2	Revision	1-10	Lecture- discussion; student participation	Discussion	Main textbook
	15.3	Revision	1-10	Lecture- discussion; student participation	Discussion	Main textbook

- **Teaching methods include:** Synchronous lecturing/meeting; Asynchronous lecturing/meeting; discussion
- **Assessment methods include:** 1. quizzes, 2. assignments, 3. midterm, 4. projects, 5. interview, 5. case studies, 6. presentation, 7. filed study 8. term papers, 9. student portfolio, 10. final exam

**23 Evaluation Methods:**

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	Intended Learning outcome	Period (Week)	Platform
Project	20		1-10	1-14	
Participation	10				
Midterm Exam	30		1-10	1-7	On campus
Final Exam	40		1-10	1-14	On campus

## 24 Course Requirements

Students should have a computer, internet connection, webcam, and account on a Microsoft Teams.

## 25 Course Policies:

A- Attendance policies:

B- Absences from exams and submitting assignments on time:

C- Health and safety procedures:

D- Honesty policy regarding cheating, plagiarism, misbehavior:

E- Grading policy:

F- Available university services that support achievement in the course:

## 26 References:

A- Required book(s), assigned reading and audio-visuals:

Jurafsky, Daniel and Martin, James H. 2023. Speech and Language Processing. Third edition draft (Jan 7, 2023).

Recommended books, materials, and media:

Dickinson, M., C. Brew, and D. Meurers. 2012. Language and Computers. Wiley-Blackwell.

## 27 Additional information:

Name of Course Coordinator: Aseel Zibin Signature: ----- Date: -----

Head of Curriculum Committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of Curriculum Committee/Faculty: ----- Signature: -----

Dean: ----- Signature: -----