Jordan University of Science and Technology
Faculty of Computer & Information Technology
Artifcial Intelligence Department

AI445 Natural Language Processing - JNQF Level: 7
First Semester 2025-2026

Course Catalog
3 Credit Hours. Natural language processing (NLP) is a crucial part of artificial intelligence (AI), modeling how people share information. This course explores current statistical and deep learning techniques for the automatic analysis of natural (human) language data. Topics: language modeling, word-sense disambiguation, morphological analysis, part-of-speech tagging, syntactic parsing, semantic interpretation, co-reference resolution, and discourse analysis. Applications: information extraction, question answering, speech recognition, interactive dialog systems, machine translation, sentiment analysis, and summarization. The course includes projects or assignments focusing on practical use cases related to course topics, or hands-on learning aligned with globally recognized professional certifications related to the subject area.
Teaching Method: On Campus

Text Book	
Title	Speech and Language Processing
Author(s)	Dan Jurafsky and James H. Martin
Edition	3rd Edition
Short Name	TB
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref#1	Natural Language Processing A Textbook with Python Implementation	Raymond Lee	1st Edition	
Ref#2	Neural Networks and Deep Learning: A Textbook	Charu C. Aggarwal	2nd Edition	

Instructor	
Name	**Dr. Rasha Obeidat**

Office Location	-
Office Hours	Sun : 10:00 - 11:00 Tue : 10:00 - 11:00 Wed : 09:00 - 10:00 Thu : 10:00 - 11:00 Thu : 13:00 - 15:00
Email	rmobeidat@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 09:00 - 10:00 Room: A2125

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
1793420	AI342 Deep Learning	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction and course logistics	**Ch1** From **TB**
Week 2	Word Representations	**Ch6** From **TB**
Week 3	Document Representation and Text Classification	**Ch4** From **TB**
Week 4	RNNs and Semantic Role Labeling	**Ch8 +Ch20** From **TB**
Week 5	Seq2Seq with Attention and Machine Translation	**Ch8+Ch15** From **TB**
Week 6	Language Models and Midterm Exam	**Ch10** From **TB**
Week 7	Self-attention and Transformers	**Ch9** From **TB**
Week 8	BERT and BERT variants	**Ch11** From **TB**
Week 9	Fine-tuning BERT for Tagging tasks, sequence Labeling and Question Answering	From **TB**
Week 10	Auto-regressive Language Models and GPT Family	**Ch12** From **TB**
Week 11	Model Alignment, Prompting, and In-Context Learning	**Ch12** From **TB**
Week 12	Constituency Parsing and Dependency Parsing	**Ch18 and Ch19** From **TB**
Week 13	Information Extraction: Named Entities, Relations and Events	**Ch20** From **TB**

Week 14	Group Project Discussion	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Explain core NLP concepts including word embeddings, document representation, and text classification. [1SO1] [1L7K1]	15%	
Describe and analyze sequence modeling techniques such as RNNs, Seq2Seq, attention mechanisms, and their applications in tasks like semantic role labeling and machine translation. [1SO1] [1L7K1]	15%	
Discuss and compare modern transformer-based language models, including BERT, GPT, and their variants, along with their use in tagging, QA, and generation tasks. [1SO1] [1L7K1]	15%	
Evaluate parsing methods and information extraction tasks such as constituency/dependency parsing, named entity recognition, and event extraction. [1SO1] [1L7K1]	10%	
Apply NLP techniques through assignments and a group project involving real-world tasks such as tagging, classification, or question answering using pretrained or fine-tuned language models. [1SO2] [1L7S1]	45%	

Relationship to Program Student Outcomes (Out of 100%)					
SO1	SO2	SO3	SO4	SO5	SO6
55	45				

Relationship to NQF Outcomes (Out of 100%)	
L7K1	L7S1
55	45

Evaluation	
Assessment Tool	**Weight**
Midterm Exam	35%
Assignments	25%
Final	40%

Policy	
Attendance	Attendance is very important for the course. In accordance with university policy, students missing more than 20% of total classes are subject to failure. Penalties may be assessed without regard to the student's performance. Attendance will be recorded at the beginning or end of each class.
Exams	All exams will be CLOSE-BOOK; necessary algorithms/equations/relations will be supplied if required.

Assignments	Assignments must be submitted before the due date; there will be discussions for the assignments scheduled after submissions.
Instructor copyrights	The instructor copyrights all course materials, including slides, assignments, project descriptions, and other instructional content. -Usage Restrictions: You may not publish, distribute, or share these materials online or in any form without explicit permission. You cannot record, reproduce, or distribute lecture content (audio, video, or written notes). Academic Integrity Reminder: Violating these policies may result in disciplinary action in accordance with university regulations.
Shared Projects with other courses	No Shared Projects or Assignments Across Courses --Policy Statement: -Students are strictly prohibited from submitting the same assignment, project, or solution to this course if it has already been submitted for another course. --Key Rules: -Assignments and projects must be original and specific to this course. -Reusing or repurposing work from another course is considered academic misconduct. -Violations may result in penalties or disciplinary actions as per university guidelines. -- Exceptions: -If explicit permission is granted by both instructors for cross-course collaboration

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