هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Natural Language Processing**
Course Code:	**CS1763**
Program:	**Computer Science**
Department:	**Computer Science and Engineering**
College:	**Computer Science and information technology**
Institution:	**Albaha University**
Version:	**: T104 – V1**
Last Revision Date:	February 9, 2023

Table of Contents:

A. General information about the course:

Course Identification	
1. Credit hours:	3
2. Course type	
a.	University ☐ College ☐ Department☒ Track☐ Others☐
b.	Required ☐ Elective☒
3. Level/year at which this course is offered: 10 / 4th year **(Elective –AI Track)**	
4. Course general Description Lecture: This course introduces fundamental techniques in the field of natural language processing (NLP). It covers the methods for parsing, knowledge representations, corpus-based methods and Information retrieval topics related to NLP. This course will also teach number of popular NLP algorithms such as CFGs, CYK, N-grams, vector space model and HMM. Moreover, evaluating NLP tasks will be studied (e.g. precision and recall). Number of tasks are to be implemented as part of the lab sessions, such as grammar parsing, POS tagging, translation, text classification and various language models. Lab: The lab part of this course introduces programming on Natural Processing Engineering in Python using Natural Language Toolkit (NLTK). The lab is planned to give students practical experiments on computational linguistics. Students will be given an introduction to NLTK. Students will also learn how to: ● Accessing text corpora and lexical resources ● Processing raw text ● Categorizing and tagging words ● Extracting information from text ● Classifying text ● Analyzing sentence structure	
5. Pre-requirements for this course (if any): Machine Learning (CS1759)	
6. Co- requirements for this course (if any): none	
7. Course Main Objective(s) **The main purpose for this course is to teach students how to:** ● Define and contrast deterministic and stochastic grammars, providing examples to show the adequacy of each. ● Simulate, apply, or implement classic and stochastic algorithms for parsing natural language. ● Identify the challenges of representing meaning. ● List the advantages of using standard corpora. ● Identify examples of current corpora for a variety of NLP tasks. ● Identify techniques for information retrieval, language translation, and text classification. ● Interact in groups collaboratively ● Communicate concepts and techniques in oral presentations	

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	100%
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning		
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	22
3.	Field	-
4.	Tutorial	-
5.	Others (specify)	-
	Total	44

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define and contrast deterministic and stochastic grammars, providing examples to show the adequacy of each.	K1	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments	● Midterm exam ● Quiz ● Final Exam
1.2	Identify the challenges of Language Models and represent text meaning.	K2	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Lab Exam
1.3	Realize the advantages of standard corpora by using variety of NLP tasks such as Part of Speech tagging, Parsing, as well as various normalization tasks.	K3	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Lab Exam

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.4	Identify techniques for information retrieval, language translation, and text classification.		▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Rubric ● Lab Exam
2.0	Skills			
2.1	Simulate, apply, or implement classic and stochastic algorithms for parsing natural language.	S1	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Rubric ● Lab Exam
2.2	Practice techniques for information retrieval, language translation, and text classification.	S2	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Lab Exam
2.3	Communicate concepts and techniques in oral presentations	S3	▪ Lecture/ Slide Presentations ▪ Exercises ▪ Assignments ▪ Lab Exercises	● Midterm exam ● Quiz ● Final Exam ● Rubric ● Lab Exam
3.0	Values, autonomy, and responsibility			
3.1	Adapt to work both independently and collaboratively	V1	Oral Presentations	Project evaluation form (Rubric)

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Natural Langue Processing	3
2.	Text Processing	2
3.	Language Models - N-grams	3
4.	Part of Speech Tagging (POS)	2
5.	Context Free Grammars (CFGs)	3
6.	Probabilistic Context-free Grammar (PCFGs)	2
7.	Parsing	2
8.	Lexical Semantics	1
9.	Computational Lexical Semantics	1
10.	Information Retrieval (IR)	1
11.	Machine Translation (MT)	1
12.	Question Answering (QA) and Summarization	1
Total		22

No	List of Topics (Lab)	Contact Hours
1.	Introduction. Language Processing and Python	1
2.	Accessing Text Corpora and Lexical Resources	3
3.	Processing Raw Text	3
4.	Writing Structured Programs	3
5.	Categorizing and Tagging Words	3
6.	Learning to Classify Text	3
7.	Extracting Information from Text	3
8.	Analyzing Sentence Structure	3
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework exercises and/or assignments	Periodically	5%
2.	Quizzes	Periodically	5%
3.	Midterm	6	20%
4.	Lab exam	12	20%
5.	Project Presentations	12	10%
6.	Final Exam	13	40%
	Total		**100%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	• Daniel Jurafsky and James H. Martin, 2008. *Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition.* Second Edition. Prentice Hall. • NLTK book (http://www.nltk.org/book). The NLTK is an open source platform offering transparent access to a broad range of algorithms and resources for computational linguistics.
Supportive References	• Computer Science Curriculum 2013 – http://cs2013.org • ACM (Association for Computer Machinery) Curricula Recommendations - http://www.acm.org/education/curricula-recommendations
Electronic Materials	• ACM (Association for Computer Machinery) web site - http://www.acm.org • ACM SIGACT (Special Interest Group on Algorithms and Computation Theory) - http://www.sigact.org/ • IEEE Computer Society web site - http://www.computer.org/portal/web/guest/home • Open access course material online
Other Learning Materials	• Christopher D. Manning and HinrichSchütze, 1999. *Foundations of Statistical Natural Language Processing.* MIT Press.

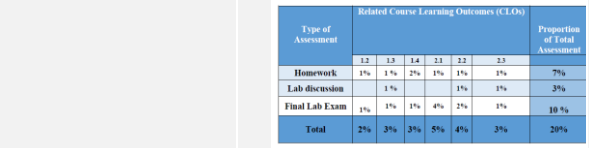
	• James Allen, 1995. *Natural Language Understanding.* Benjamin/Cummings, 2ed. • Gerald Gazdar and Chris Mellish. 1989. *Natural Language Processing in Lisp.*Addison-Wesley. • Frederick Jelinek, 1998. *Statistical Methods for Speech Recognition.* MIT Press

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• A classroom or lecture hall with whiteboard for 25 students. • A digital circuit's laboratory.
Technology equipment (projector, smart board, software)	• A digital image projection system with connection to desktop computer and laptop computer. • High speed Internet connection. • An instructor computer station.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	• Students • Faculty • Peer Reviewers • Program Leader • Course Coordinator	• Surveys (indirect). • Direct feedback from students (interview between Program leader and students). • Course evaluation by Peer Reviewers (indirect). • Class visit by Program Leader • Comprehensive Course report (where we can find information about teaching difficulties and action plan, …)
Effectiveness of students assessment	• Students • Faculty • Peer Reviewers	• Surveys (indirect). • Direct feedback from students (interview

Assessment Areas/Issues	Assessor	Assessment Methods
	● Course Coordinator ● Exam Evaluation Committee ● Course Coordinator	between Program leader and students). ● Assessment results (direct) ● Course evaluation by Peer Reviewers (indirect). ● Comprehensive Course report (where we can find information about assessment difficulties and action plan, …) ● Exam evaluation by the Exam Evaluation Committee (indirect)
Quality of learning resources	● Students ● Faculty ● Peer Reviewers ● Course Coordinator	● Surveys (indirect) ● Course evaluation by Peer Reviewers (indirect). ● Comprehensive Course report (where we can find  information about difficulties and challenges about learning resources as well as consequences and action plan, …)
The extent to which CLOs have been achieved	● Faculty ● Program Leader ● Course Coordinator ●	● Student Results (direct) ● Comprehensive Course report (where we can find the CLO assessment results)
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	

REFERENCE NO.	
DATE	