Course Specifications

Course Title:	**Natural Languages Processing**
Course Code:	**AI 412**
Program:	**Information and Computer Sciences**
Department:	**Computer Science and Information**
College:	**College of Science at AzZulfi**
Institution:	**Majmaah University**

Table of Contents

A. Course Identification

1. Credit hours:
2. Course type **a.** University ☐ College ☐ Department ☐ Others ☐ **b.** Required ☐ Elective ☐
3. Level/year at which this course is offered:
4. Pre-requisites for this course (if any)**:** ICS 411
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	✔	80
2	**Blended**	✔	5
3	**E-learning**	✔	5
4	**Correspondence**	--	5
5	**Other**	✔	5

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	15
3	**Tutorial**	15
4	**Others** (specify)	--
	Total	60
Other Learning Hours*		
1	**Study**	45
2	**Assignments**	15
3	**Library**	05
4	**Projects/Research Essays/Theses**	10
5	**Others** (specify)	00
	Total	(60+75 = 135)

***** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

Natural Language Processing (NLP) develops statistical techniques and algorithms to automatically process natural languages (such as English). It includes a number of AI areas, such as text understanding and summarization, machine translation, and sentiment analysis. This subject introduces the foundations of technologies in NLP and their application to practical problems. It brings together the state-of-the-art research and practical techniques in NLP, providing students with the knowledge and capacity to conduct NLP research and to develop NLP projects.

2. Course Main Objective

The main objective of this course is to introduce the fundamental concepts and techniques of natural language processing (NLP). Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	Understand approaches to syntax and semantics in NLP, approaches to discourse, generation, dialogue and summarization within NLP and current methods for statistical approaches to machine translation.	K3-AI
2	**Skills :**	
2.1	Use NLP technologies to explore and gain a broad understanding of text data	S3-AI
2.2	Apply NLP methods to analyse sentiment of a text document and methods to perform topic modelling.	S3-AI
3	**Competence:**	
3.1	Relate between Regular Expressions and Automata, Finite State transducers and morphology, probabilistic models of spelling, n-grams, word classes and part of speech tagging using maximum entropy.	**C3-AI**
3.2	Communicate effectively with others in Computer Science field.	

C. Course Content

No	List of Topics	Contact Hours
1	• INTRODUCTION	4
2	• WORDS Regular Expressions and Automata, Finite State Transducers and Morphology, Probabilistic models of spelling, N-grams	12
3	• SYNTAX Word Classes and Part of Speech Tagging using Maximum Entropy models and Hidden Markov Models, Context Free Grammars for English, Features and Unification, Lexicalized and Probabilistic Parsing, Language and Complexity	12
4	• SEMANTICS Representing Meaning, Semantic Analysis, Lexical Semantics, Word Sense Disambiguation and Information Retrieval	16
5	• PRAGMATICS	16

	Discourse, Dialogue and Conversational agents, Natural Language Generation, Machine Translation	
...		
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Students will be able to demonstrate knowledge of basic syntax and semantics in NLP, approaches to discourse, generation, dialogue and summarization within NLP and current methods for statistical approaches to machine translation.	Lectures, Lab demonstrations Case studies Individual presentations	Written Exam Homework assignment class & lab Activity Quizzes
2.0	**Skills**		
2.1	Students will be able to use technologies, to explore and gain a broad understanding of text data.	Group discussions, Lab demonstrations, Brainstorming Presentations	Home works and assignments
2.2	Students can use NLP technologies to explore and gain a broad understanding of text data		
3.0	**Competence**		
3.1	Students will apply design and development principles in the construction of software systems of varying complexity	Group discussions, Case Studies, Brainstorming Presentations	Written Exam Homework assignments Class & lab Activities Quizzes
3.2	Students will function effectively as a member of a team in order to accomplish a common goal		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	First written mid-term exam	6	20%
2	Second written mid-term exam	12	20%
3	Class activities, group discussions, Presentation + lab	Every week	10%
4	Homework + Assignments	After Every chapter	10%
5	Final written exam	16	40%

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice : **Office hours: ,** **Email: .....@mu.edu.sa**

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1. Daniel Jurafsky, James H. Martin: "Speech and Language Processing", 3/E, Prentice Hall, 2020.
Essential References Materials	1. James Allen, "Natural Language Understanding", 2/E, Addison-Wesley, 1994 2. Christopher D. Manning, Hinrich Schutze: "Foundations of Statistical Natural Language Processing", MIT Press, 1999
Electronic Materials	NLP tutorial: https://www.upf.edu/web/mtg/nlp-tutorial Foundations of Statistical Natural Language Processing: https://nlp.stanford.edu/fsnlp The structure of modern English: https://muse.jhu.edu/article/19425
Other Learning Materials	----------

2.

Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1. Classrooms with required digital aids and to support traditional method of teaching using blackboard. 2. Classrooms with proper lighting and air conditioning system integrated with the sound System /audio system. 3. Classroom with smart board interface, display screen and a computer to aid the sessions
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board with supporting software / computers with updated versions of software as required to understand the subject concepts with quality headphones.
Other Resources	NIL

Item	Resources
(Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching	Students Classroom Observation Committee Professional Development Unit External Reviewers – accreditation committee	Formal Classroom Observation - Direct Student Surveys - Indirect
Effectiveness of Assessment	Curriculum and Test Development Unit Curriculum Committee Assessment Committee External Reviewers	Faculty Feedback - indirect Student Feedback – indirect Course Reports
Extent of Achievement of Course Learning Outcomes	Quality Assurance Unit Curriculum and Test Development Unit	Course Reports Annual Program Review

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	