University of Computer Studies (Thaton)
2025-2026 Academic Year
Fifth Year (B.C.Sc.)
Lecture Plan

CS-5112 Advanced Artificial Intelligence II **First Semester**

Textbooks:

[1] Analyzing Text with the Natural Language Toolkit (First edition), O'Reilly 2009.

[2] Daniel Jurafsky and James H. Martin, Speech and Language Processing, Draft Third Edition, December 30, 2020

References:

[1] Text Analytics with Python, Dipanjan Sarkar.

[2] Corpus Linguistics, Tony McEnery (Edition 2), Andrew Wilson.

[3] Daniel Jurafsky and James H. Martin, Speech and Language Processing, Second Edition, Prentice Hall, 2008, ISBN-0-13-095069-6

[4] Christopher D. Manning, Hinrich Schütze, Foundations of Statistical Natural Language Processing, The MIT Press; 1st Edition (June 18, 1999), ISBN-10:0262133601, ISBN-13: 978-0262133609

Prerequisite : CS-4214
Credit Unit : 3 ACUs
Periods : 64 periods for 16 weeks (4 periods * 16 weeks) (1 period - 1 hr.)

No.	Topics	Week	Remark
1.	**Language Processing and python**	**Week 1-3**	
	Computing with language: texts and words - Searching Text - Counting Vocabulary - Texts as lists of words Computing with Language: - Simple Statistics Automatic Natural Language Understanding - Word Sense Disambiguation - Machine Translation		Lectures + Assignments+ Practical+ Explain NLP with python
2.	**Accessing Text Corpora and Lexical Resources**	**Week 4-6**	
	Accessing Text Corpora Conditional Frequency Distributions		Lectures + Assignments + Practical
3.	**Regular Expressions and Finite State Automata**	**Week 7-8**	
	Regular Expressions Finite State Automata		Lectures + Assignments + Practical
4.	**N-Grams**	**Week 9-12**	
	Language Models Counting Words in Corpora Simple(unsmoothed) N-Grams Training and Test sets Evaluating N-Grams: Perplexity		Lectures + Assignments + Practical + Lab + Project

No.	Topics	Week	Remark
	Smoothing - Project on N-Grams Language Modelling		
5.	**Hidden Markov Models and Maximum Entropy Models**	**Week 13-16**	
	Markov Chains Introduction to Hidden Markov Models The forward Algorithm Decoding: The Viterbi Algorithm Training: Forward-Backward Algorithm Project on HMM POS Tagging		Lectures + Assignments + Practical + Lab + Project

Assessment Plan for the Course

Projects	20 %
Assignments, Labs	20 %
Paper Exam	60 %