

NATURAL LANGUAGE PROCESSING

B.Tech. III Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite: Data structures, finite automata and probability theory

Course Objectives:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes:

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
- Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms
- Able to design different language modeling Techniques.

Unit: I

Finding the Structure of Words:

Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models

Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

Unit: II

Syntax Analysis:

Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

Unit: III

Semantic Parsing:

Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

Unit: IV

Predicate-

Predicate-Argument Structure, Meaning Representation Systems, Software.

Unit: V

Uncertain knowledge and Learning

Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure

Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling

Text Books:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M.Bikel and Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary

REFERENCE BOOK:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications

ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING LAB

B.Tech. III Year II Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Course Objectives:

1. Become familiar with basic principles of AI toward problem solving, knowledge representation, and learning.
2. Knowledge on basic Language processing features, design an innovative application using NLP components

List of Experiments (AI)

- 1) Write a program in prolog to implement simple facts and Queries
- 2) Write a program in prolog to implement simple arithmetic
- 3) Write a program in prolog to solve Monkey banana problem
- 4) Write a program in prolog to solve Tower of Hanoi
- 5) Write a program in prolog to solve 8 Puzzle problems
- 6) Write a program in prolog to solve 4-Queens problem
- 7) Write a program in prolog to solve Traveling salesman problem
- 8) Write a program in prolog for Water jug problem

List of Experiments (NLP)

1. Word Analysis
2. Word Generation
3. Morphology
4. N-Grams
5. N-Grams Smoothing

Text Books:

1. Artificial Intelligence: A Modern Approach Third Edition Stuart Russell and Peter Norvig, 2010. Pearson Education, Inc. ISBN: 978-0-13-604259-4
2. Daniel Jurafsky, James H. Martin—Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.
3. Steven Bird, Ewan Klein and Edward Loper, —Natural Language Processing with Python, First Edition, O'Reilly Media, 2009.

REFERENCE BOOK:

1. Breck Baldwin, —Language Processing with Java and Ling Pipe Cookbook, Atlantic Publisher, 2015.