

Course Code: CSE 445	CIE Marks: 60
Course Title: Natural Language Processing	SEE Marks: 40
Credits: 3	Weekly: 3 Hours
	Total Week: 15

Program Learning Outcomes (PLOs)

At the time of graduation, the graduate must be able to

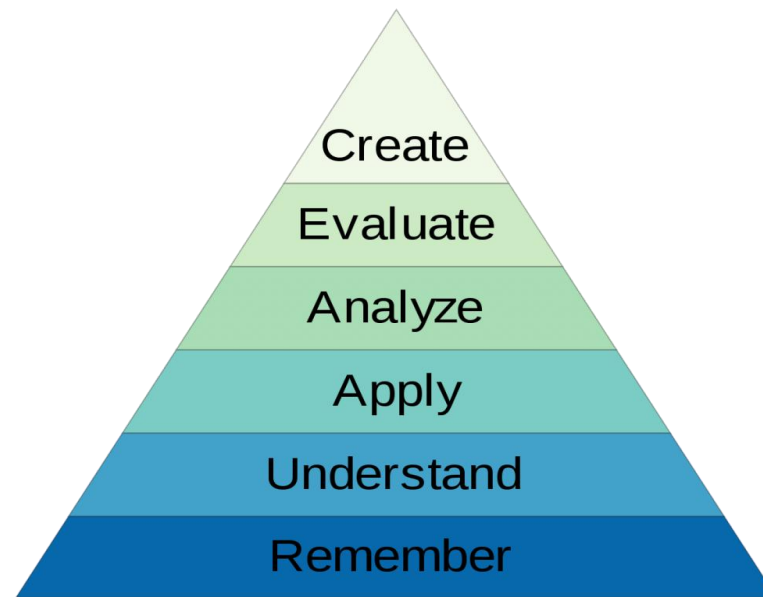
S. No		have: PLOs
1	PLO 1	Engineering Knowledge
2	PLO 2	Problem Analysis
3	PLO 3	Design/Development of Solutions
4	PLO 4	Investigation
5	PLO 5	Modern Tools Usage
6	PLO 6	The Engineers and Society
7	PLO 7	Environment and Sustainability
8	PLO 8	Ethics
9	PLO 9	Individual and Team Work
10	PLO 10	Communication
11	PLO 11	Project Mangement
12	PLO 12	Life Long Learning

Note: Each student has to achieve passing score in each PLO

Course objective:

To give a firm conceptual grasp of natural language processing's core concepts. Specifically,

- To gain a solid understanding of the **foundational concepts** and techniques in **Natural Language Processing (NLP)**.
- To develop **Practical Skills** in text **Preprocessing**, text representation, and language **modeling**.
- To learn to implement NLP models for tasks such as text **classification, sentiment analysis, named entity recognition**, and machine translation.
- To explore advanced topics in NLP, including **question answering** systems, **dialogue systems**, and **ethical** considerations in NLP applications.



Course Learning Outcome (CO): (at the end of the course, students will be able to:)

CO1	Define the fundamental concepts and techniques of Natural Language Processing (NLP) and their applications.
CO2	Analyze different natural language based models for text classification and clustering
CO3	Analyze different deep learning based models for language analysis.
CO4	Apply Explainable Artificial Intelligence
CO5	Apply Speech analysis techniques

Content of the course:

Week	Course Content (as summary)	Hrs	Cos
1	Introduction and importance of Natural Language Processing; Motivations; Applications; Real Life Case Study	1.25	CO1
2	Discussion on Text Preprocessing	1.25	CO2
3	Discussion on advanced text preprocessing	2.5	CO2
4	Discussion on Bag of Words	2.5	CO2
5	Discussion on TF-IDF	2.5	CO2
6	Discussion on Naive Bayes and Text Classification	2.5	CO3
7	Discussion on Artificial Neural Network	2.5	CO3
8	Discussion on Word Embedding	2.5	CO3
9	Discussion on Recurrent Neural Network Inheritance.	2.5	CO3
10	Discussion on Seq2Seq Model	2.5	CO3
11	Discussion on Transformer	2.5	CO3
12	Discussion on Explainable AI	2.5	CO4
13	Discussion on Explainable AI	2.5	CO4
14	Discussion on Speech Processing	2.5	CO5
15	Discussion on Speech Processing	2.5	CO5
16	Review	2.5	
Total		40	

Mapping of Course Learning Outcomes to Program Learning Outcomes:

CO's/P O's	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2
C01	✓											
C02		✓										
C03			✓									
C04					✓							
C05					✓							
CO%					✓							

Assessment Pattern:

Assessment Task	CO's					Mark (Total=100)
	CO 1	CO 2	CO 3	CO 4	CO 5	
Attendance	--	--	--	--	--	7
Class Test	--	--	--	--	--	15
Assignment	--	--	--	--	--	5
Presentation	--	--	--	--	--	8
Midterm Examination	5	10	10			25
Final Examination			10	15	15	40
Total Marks	5	10	20	15	15	100

CIE – Breakup [60 marks]

Bloom's Criteria	Attendance (07)	Class (15)	Test	Assignment (05)	Presentation (08)	Mid Exam (25)
Remember		02				2.5
Understand		05		02	02	7.5
Apply		05			03	12.5
Analyze		03		03	03	2.5
Evaluate						
Create						

SEE – Semester End Examination [40 marks]

Bloom Criteria	Score for the Test
Remember	5
Understand	10
Apply	20
Analyze	5
Evaluate	
Create	

Learning Materials:

Textbook/Recommended Readings:

1. Jurafsky and Martin, “Speech and Language Processing”, Prentice Hall, 2009.
2. Manning and Schutze, “Foundations of Statistical Natural Language Processing”, MIT Press, 1999. Larry Wall, Tom Christiansen, Jon Orwant. Programming Perl. O’Reilly. 1996. ISBN 1-56592-149-6

Reference Books/Supplementary Readings:

1. Online materials
2. Online resources using Google search engine, YouTube, etc.

Other Readings:

1. Powerpoint Lecture Slide Prepared by course teachers