

**NATURAL LANGUAGE PROCESSING**

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| **Department:** | Department of Computer Science and Engineering | | |
| **Course Name:**  **NATURAL LANGUAGE PROCESSING Lab** | **Course Code** | L-T-P | Credits |
| **ENSP 352** | 2-0-1 | 2 |
| **Type of Course:** | Major | | |

**Proposed Lab Experiments**

**Defined Course Outcomes**

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| COs |  |
| **CO 1** | To Understand the basic concept of Natural Language and NLP application |
| **CO 2** | Understand the context of Text Preparation for NLP application. |
| **CO 3** | To Understand the basic concept of Text Classification |
| **CO 4** | Build and evaluate deep learning models using Keras. |
| **CO 5** | Basic foundation of Chat GPT and Transformer for NLP application |

1 | P a g e



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| **Ex. No.** | **Experiment Title** | **Mapped CO/COs** |
| 1 | **Objective:** Extract and collect textual data (e.g., news articles, product reviews, or tweets) from web pages for NLP tasks.  **Concepts:** Data acquisition, HTML parsing, text extraction, data cleaning.  **Tools:** BeautifulSoup, Requests, Pandas, Selenium (optional). | CO1 |
| 2 | |  | | --- | | **Objective:** Detect and classify emotions (e.g., joy, anger, sadness) from given text data using NLP methods.  **Concepts:** NLP applications, feature extraction, supervised classification.  **Tools:** Python, Scikit-learn, NLTK, Hugging Face Transformers. |  |  | | --- | |  | | CO1 |
| 3 | **Objective:** Understand how NLP is applied in various domains like healthcare, business, and education.  **Concepts:** Real-world NLP applications, ambiguity, context, and diversity in language.  **Tools:** Case study discussion, datasets exploration, **Word Cloud visualization using Python (Matplotlib, WordCloud library)**. | CO2 |
| 4 | **Objective:** Explore and compare text representation techniques such as Bag-of-Words, TF-IDF, and Word2Vec.  **Concepts:** Feature extraction, vectorization, semantic similarity.  **Tools:** Scikit-learn, Gensim, spaCy. | CO2 |

2 | P a g e



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| 5 | **Objective:** Explore and compare text representation techniques such as Bag-of-Words, TF-IDF, and Word2Vec.  **Concepts:** Feature extraction, vectorization, semantic similarity.  **Tools:** Scikit-learn, Gensim, spaCy. | CO2 |
| 6 | **Objective:** Create and evaluate text classifiers using algorithms like Naïve Bayes, SVM, and LSTM.  **Concepts:** Model training, validation, precision-recall analysis.  **Tools:** Scikit-learn, TensorFlow / Keras, Pandas. | CO2 |
| 7 | **Objective:** Extract named entities, relations, and part-of-speech tags from text data.  **Concepts:** Named Entity Recognition (NER), POS tagging, dependency parsing.  **Tools:** spaCy, NLTK. | CO2 |
| 8 | **Objective:** Develop a simple chatbot using rule-based or transformer-based architectures.  **Concepts:** Dialog management, intent classification, response generation.  **Tools:** Python, NLTK, Hugging Face Transformers. | CO2 |
| 9 | **Objective:** Perform sentiment and trend analysis on social media datasets such as Twitter or Reddit.  **Concepts:** Sentiment analysis, data visualization, text mining.  **Tools:** Tweepy, Pandas, Matplotlib, TextBlob. | CO3 |

3 | P a g e

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| 10 | **Objective:** Apply NLP for analyzing product reviews and customer opinions in e-commerce platforms.  **Concepts:** Opinion mining, recommendation insights, keyword extraction.  **Tools:** Python, Scikit-learn, spaCy. | CO3 |
| 11 | **Objective:** Extract and analyze popular hashtags or trending topics using text frequency analysis.  **Concepts:** Tokenization, frequency distribution, N-grams, visualization.  **Tools:** Python, Pandas, WordCloud, NLTK. | CO 4-5 |
| 12 | **Objective:** Use pre-trained transformer models (like BERT or GPT) for text classification and analyze transfer learning benefits.  **Concepts:** Transformer architecture, attention mechanism, fine-tuning.  **Tools:** Hugging Face Transformers, PyTorch / TensorFlow. | Co 5 |

4 | P a g e