



South Indian Education Society's  
GRADUATE SCHOOL OF TECHNOLOGY, Navi Mumbai.  
DEPARTMENT OF INFORMATION TECHNOLOGY



## Natural Language Processing

June 27 to July 04, 2022

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The field of natural language processing (NLP) is one of the most important and useful application areas of artificial intelligence. NLP is undergoing rapid evolution as new methods and toolsets converge with an ever-expanding availability of data. In this course you will explore the fundamental concepts of NLP and its role in current and emerging technologies. NLP itself is an umbrella term that refers to a bunch of related technologies. NLP is at the core of Sentiment analysis, text extraction, machine translation, conversational AI, document AI, text summarization and the list goes on. As AI systems become more and more intelligent, these systems would need to interact with humans in a rich, context-aware manner. It is NLP that would make it possible for machines to understand the context in which they operate.

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### About Instructors:

This course will be taught by a team of various eminent experts from Industry and SIESGST faculty members of the Computer Engineering Department and Information Technology Department.

### Industry Expert:

1. Mr. Rohan Naik- Senior software Developer at AirFi.Aero

### Faculty Members:

1. Dr. Versha Patil Associate Professor
2. Dr. Gayatri Bachhav Assistant Professor

## Course Objectives:

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To understand natural language processing and to learn how to apply basic algorithms in this field
To get acquainted with the basic concepts and algorithmic description of the main language levels: morphology, syntax, semantics, and pragmatics.
To design and implement applications based on natural language processing
To implement various language Models.

## Course Outcomes:

On successful completion of the course, the learner will be able to:

- Students will have a broad understanding of the field of natural language processing.
- Students will be able to Process the text data at syntactic and semantic level
- Students will be able to Model linguistic phenomena with formal grammar
- Students will be able to Design, implement and analyze NLP algorithms  
Students will be able to Apply NLP techniques to design real world NLP applications, such as machine translation
- Students will be able to implement text categorization, text summarization, information extraction, etc.
- Students will be able to Implement proper experimental methodology for training and evaluating empirical NLP systems

## Course Content:

Prerequisite: Natural Language Processing [NLTK] , Datasets , Python programming, Windows.

Module	Contents	Hours
1.	<b>Fundamentals of Natural Language Processing:</b> Introduction to NLP, History of NLP, Generic NLP system, levels of NLP , Knowledge in language processing , Ambiguity in Natural language , stages in NLP, Difficulties in NLP ,challenges of NLP ,Applications of NLP, Word Level Analysis: Morphology analysis –survey of English Morphology, Inflectional morphology & Derivational morphology. Hands-on	5hrs
2	<b>Pre-processing of NLP:</b> Tokenization, Stop Word Removal, Filtration, Script Validation, Regular Expression, Stemming, Lemmatization. Mini Applications: Chabot	5hrs
3.	<b>Morphological Analysis Language Modelling:</b> N-gram, Syntax Analysis: Part of Speech tagging, HMM, Maximum Entropy, Conditional Random Field. Hands-on	5 hrs

4.	<b>Syntax Analysis:</b> Top down and Bottom up parser Semantic Analysis: Worldnet, Synset, Word Sense Disambiguation approach. Mini Applications: Named Entity Recognition (NER)	5 hrs
5.	<b>Communicating and Computing with Natural Language :</b> Learn advanced techniques like word embeddings, deep learning attention, and more. Ethical Considerations for NLP. Build a machine translation model using recurrent neural network architectures. Build a speech recognition model using deep neural networks.	5 hrs
6.	<b>Recent Trends :</b> Recent trends in NLP: INTELLIGENT INFORMATION RETRIEVAL GPT-Generative Pretrained Transformers, BERT-Bidirectional Encoder Representation from Transformer. Applications ( 4 to 5 applications expected)	5 hrs
7	Problem statement formulation for Mini project and it's Implementation based on the concepts learned.	05 hrs

### Assessment:

1. Module wise assignments and quizzes should be completed by students.
2. One month Internship will be provided subject to the successful completion of Mini Project.

**Course Coordinators:** Dr.Gayatri Bachhav  
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