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UNIVERSITY BAREILLY

BCS-095	Speech and Natural Language Processing	L T P 3 0 0	3 Credits

Pre-requisites:

Course Objectives:

CO1	To learn basic about NPL
CO2	To understand the basic use of formal languages
CO3	To learn about FST
CO4	To understand the concept of text to speech
CO5	TO understand concept of Regular Expressions

Detailed Syllabus

MODULE-I

Introduction of NLP: Knowledge in Speech and Language processing, ambiguity and models and algorithm, language and understanding, brief history. **Regular Expressions, Automata, Similarity Computation:** Regular Expressions, patterns, FA, Formal Language, NFSA, Regular Language and FSAs, Raw Text Extraction and Tokenization, Extracting Terms from Tokens, Vector Space Representation and Normalization, Similarity Computation in Text.

MODULE-II

Morphology and Finite-State Transducers: Inflection, Derivational Morphology, Finite-State Morphological Parsing, The Lexicon and Morphotactic, Morphological Parsing with Finite State Transducers, Combining FST Lexicon and Rules, **Lexicon-free FSTs:** The Porter Stemmer, Human Morphological Processing. Matrix Factorization and Topic Modeling: Introduction, Singular Value Decomposition, Nonnegative Matrix Factorization, Probabilistic Latent Semantic Analysis, Latent Dirichlet Allocation.

MODULE-III

Computational Phonology and Text-to-Speech: Speech Sounds and Phonetic Transcription, The Phoneme and Phonological Rules, Phonological Rules and Transducers, Advanced Issues in Computational Phonology, Machine Learning of Phonological Rules, Mapping Text to Phones for TTS, Prosody in TTS. Probabilistic Models of Pronunciation and Spelling: Dealing with Spelling Errors, Spelling Error Patterns, Detecting NonWord Errors, Probabilistic Models, Applying the Bayesian method to spelling, Minimum Edit Distance, English Pronunciation Variation, The Bayesian method for pronunciation and Weighted Automata, Pronunciation in Humans

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Course Outcomes: After the completion of the course the student will be able to:

CO1	Student able to explain NPL
CO2	Students able to implement Regular Expressions
CO3	Students able to implement Bayesian method for pronunciation
CO4	Student implement the concept of Text to speech
CO5	Enable the students to use Formal Languages

Text Books:

1. Steven Bird, Ewan Klein and Edward Loper, Natural Language Processing with Python.
2. Daniel Jurafsky and James H. Martin, Speech and Language Processing.
3. James Allen, Natural Language Understanding