**Department of Computer Science**

**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (CSM)**

**III B. Tech II - Semester**

**Micro –Syllabus for Natural Language Processing**

| **Unit-I: Introduction to NLP** | | |
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| Unit | Module | Micro Content |
| **Unit – I** | Introduction | 1. Welcome |
| 2. Motivations and Road Map |
| 3. What is Natural Language Processing |
| Language Ambiguity | 4. The Problem of Ambiguity and Uncertainty in  Languages |
| 5. The Turing test |
| 6. NLP Representations in Syntax |
| Semantics and Deep Learning Role | 7. Semantics and pragmatics |
| 8. The Applications of NLP |
| 9. The Role of Deep Learning in NLP |
| DL Models and Applications of NLP | 10. Deep Learning for NL Computing |
| **Unit-II : Syntactic Parsing** | | |
| Unit | Module | Micro Content |
| **Unit-II** | Grammar | 11. Grammar formalisms |
| Tree Banks | 12. Tree banks |
| 13. Tree banks Construction |
| Context Free Grammar | 14. Context Free Grammars (CFGs) |
| 15. Efficient parsing for  Context Free Grammars  (CFGs) |
| Probabilistic CFG | 16. Probabilistic  CFGs(PCFGs) |
| 17. Statistical Parsing and Probabilistic  CFGs(PCFGs) |
| Lexical Parsing | 18. Lexicalized PCFGs |
| Semantic Analysis | 19. Semantic Analysis :  Lexical Semantics |
| Semantic Parsing | 20. Word-sense ambiguities |
|  | 21. Compositional Semantics |
|  | 22. Compositional Semantics |
| Sematic Labeling and Parsing | 23. Semantic Role Labeling |
|  | 24. Semantic Parsing |
|  | 25. Semantic Parsing |

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| **Unit-III : N-Gram Language Models** | | |
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| Unit | Module | Micro Content |
| **Unit-III** | N-Gram Model | 26. Language Models |
| 27. Simple N-Gram models |
| Parameter Tanning and  Optimization | 28. Estimating Parameters |
| 29. Parameter smoothing |
| 30. Evaluating language  models |
| POS Tagging and Labeling | 31. POS Tagging |
| 32. POS Tagging Structures and Representations |
| 33. Sequence Labeling |
| 34. Lexical Syntax. |
| POS Tagging Models | 35. Hidden Markov Models |
| 36. Forward Model |
| 37. Viterbi Algorithm |
| 38. EM Training |
| **Unit-IV: Deep Learning for Named Entity Recognition** | | |
| Unit | Module | Micro Content |
| **Unit –IV** | Deep Learning Parameterization for NER | 39. Dependency Parsing |
| 40. Gradient Checks |
| DL Optimization Methods | 41. Overfitting |
| 42. Regularization |
| 43. Activation Function |
| 44. Multitask Optimization |
| 45. Semi Supervised Learning. |
| Text Process with Embedding and Converting to Vectorization | 46. Text Embedding: Word Vector representation |
| Vectorization models | 47. Word2vec model |
| 48. GloVe model |
| 49. Advanced Word Vector Representations |
| 50. Sequence-to-Sequence Model |
| **Unit-V: Information Extraction(IE)** | | |
| Unit | Module | Micro Content |
| **Unit-V** | Named Entity Recognition | 51. Named Entity Recognition |
| 52. Relation Extraction |
| Sequence Labeling | 53. using Sequence labeling |
| Machine Translation | 54. Machine Translation(MT): |
| 55. Basic issues in MT |
| Translation Process and Word by word and Phrase by Phrase | 56. Statistical translation |
| 57. Word Alignment |
| 58. Phrase based Translation |

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