SCHEME OF COURSE WORK
Dept. of Information Technology

Course Details:

Course Title	**Natural Langue Processing**		
Course Code	**15IT11M2**	**L T P C**	**: 3 0 0 3**
Program:	**B.Tech**		
Specialization:	**IT (Professional Elective III – Online)**		
Semester	**VI**		
Prerequisites	**Data Structures, Artificial Intelligence, Introduction to Machine Learning**		
Courses to which it is a prerequisite	**None**		

Course Outcomes (COs):

1	Understand the basic concepts of NLP
2	Understand Indian Language Processing Techniques
3	Understand Hidden Markov Models and forward backward algorithms
4	Understand the basic IR models
5	Understand the techniques of Word Sense Disambiguation

Course Outcome versus **Program Outcomes**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3											3	2		
CO2	3											3	2		
CO3	3											2	1		
CO4	3											2	1		
CO5	3											2	1		

Assessment Methods: Assignment / Quiz / Seminar / Case Study /Mid-Test / End Exam

Programme Specific Outcomes (PSOs)

At the end of the Programme, a student will be able to

PSO1: Plan, develop, implement, and evaluate IT solutions to specific business problems usingspecific programming language and software tools.

PSO2: Design and Develop Network, Mobile and Web-based Computational systems underrealistic constraints.

PSO3: Design and implement fundamental network security solutions.

Programme Outcomes (POs)

At the end of the Programme, a student will be able to

PO1: Apply the knowledge of mathematics, science, engineering fundamentals and principles of Information Technology to solve problems in different domains.

PO2: Analyze a problem, identify and formulate the computing requirements appropriate to its solution.

PO3: Understand to design, develop and evaluate software components and applications that meet specifications within the realistic constraints including cultural, societal and environmental considerations.

PO4: Design and conduct experiments, as well as analyze and interpret data

PO5: Use appropriate techniques and tools to solve domain specific interdisciplinary problems.

PO6: Understand the impact of Information technology on environment and the evolution and importance of green computing.

PO7: Analyze the local and global impact of computing on individual as well as on society and incorporate the results in to engineering practice.

PO8: Demonstrate professional ethical practices and social responsibilities in global and societal contexts.

PO9: Function effectively as an individual, and as a member or leader in diverse andmultidisciplinary teams.

PO10: Communicate effectively with the engineering community and with society at large.

PO11: Understand engineering and management principles and apply these to one's own work, asa member and leader in a team, to manage projects.

PO12: Recognize the need for updating the knowledge in the chosen field and imbibing learning tolearn skills.

Teaching-Learning and Evaluation

Week	Topic/Contents	Course Outcome	Sample Questions	Teaching Learning Strategy	Assessment Method & Schedule
1	Introduction, Stages of NLP, Stages of NLP Continue, Two approaches to NLP.	CO 1	1. Role of NLP in the domain of AI. 2. What are the different stages of NLP? 3. Explain the procedure to incorporate NLP in the domain specific problems.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)

2	Sequence Labeling and Noisy Channel, Noisy Channel: Argmax based computation	CO 1	1. What is sequence labelling in the time series data?	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
3	Argmax based computation, Noisy Channel Application to NLP	CO 1	1. What is argmax based computation in solving the NLP problems.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
4	Brief on probabilistic parsing & Start of part of speech tagging, Part of Speech Tagging, Part of Speech Tagging continued	CO 2	1. What is probabilistic parsing explain in detail. 2. What POS explain in detail.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
5	Part of Speech Tagging continued & Indian Language in Focus, Morphology analysis, Part of Speech Tagging continued & Indian Language consideration, accuracy measure	CO 2	1. How to apply NLP techniques to Indian languages. 2. How to measure accuracy of POS.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
6	POS Tagging, Fundamental Principle, Why Challenging, accuracy, POS Tagging, Accuracy Measurement, Word Categories, AI and Probability: HMM	CO 2	1. What are the fundamental principles of POS tagging.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
7	HMM, Viterbi, Forward Backward Algorithm	CO 3	1. Explain Forward and Backward algorithm.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
8	HMM, Viterbi, Forward Backward Algorithm Continued	CO 3	1. What is HMM, how to apply HMM to NLP.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 8)
9	Mid Test - I				

10	HMM, Viterbi, Forward Backward Algorithm, Baum Welch Algorithm, HMM, Viterbi, Forward, Backward Algorithm, Baum Welch Algorithm Cont...	CO 3	1. Explain with an example Baum Welch Algorithm.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
11	Natural Language Processing and information retrieval	CO 3	1. How NLP and IRS are related, explain the applications of NLP in the domain of IRS.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
12	CLIA,IR Basics, IR Models, Boolean Vector	CO 3	1. What are different IR models explain with suitable examples.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
13	IR Models, NLP and IR relationship, PCA, SVD, Towards Latent Semantics Indexing (LSI)	CO 4	1. What is PCA, explain how PCA can be applied to reduce the size of the dataset.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
14	Wordnet and Word Sense Disambiguation.	CO 4	1. What is word sense disambiguation?	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
15	Wordnet and Word Sense Disambiguation cont, Wordnet, Metonymy Word Sense Disambiguation	CO 4	1. How to overcome word sense disambiguation while processing Natural language.	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
16	Word Sense Disambiguation, Overlap based method, supervised method, Word Sense Disambiguation, supervised and unsupervised methods, Word Sense Disambiguation, semi-supervised and unsupervised methods,	CO 5	1. What are the different supervise word sense disambiguation methods explain with examples. 2. What are the different unsupervised word sense disambiguation methods explain with	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)

	resource – constrained WSD		examples.		
17	resource – constrained WSD, Parsing Algorithm, Parsing Ambiguous sentences, Probabilistic Parsing, Probabilistic Parsing Algorithms	CO 5	1. Explain Parsing algorithm with example. 2. Explain probabilistic parsing algorithm with example	Online Video Lecturing, Doubt Clarification, Sample Experiments	Assignment – I, Quiz – I Mid – I (Week – 18)
18	Mid Test - II				
19/20	End Semester Examination				