Course Name:	**Natural Language Processing**	**Course Code:**			**CSL772**
Department:	**Computer Science Engineering**	**Type:**			**DE/OE**
L-T-P Structure	**3-0-2**	**Credits**	**4**	**Pre-requisite:**	
Course Objectives	This course provides a broad introduction to various problems in Natural Language Processing domain. Various traditional and state-of-the-art models will be discussed for real time applications. This will also include basics of AI and ML with Deep Learning approaches to solve various existing problems in the domain.				
Course Outcome	**At the end of the course, the students will be able to:** 1. Learn the basic concepts, problems and applications in NLP. 2. Development of various basic packages and projects. 3. Design and Develop strategies to solve the complex problems in the domain.				

Course Contents:	**Topics**	**No. of Hours**
1	Course Structure and Introduction to Natural Language Processing (applications and Problems)	1
2	Language Models (Context Free Grammar (CFG), Probabilistic CFG), Logics, Part of Speech Tagging, Word and Sentence structure	5
3	Data Pre-processing (Tokenization, stemming, augmentation and correction)	2
4	Bag of Words, n-gram models, Vector representations (TF, TF-IDF), Topic Modelling (LDA, LSI etc.)	9
5	Word Vector Embedding, Sentiment Classification, Chat bots (Auto-Regression, Neural Network (NN), Recurrent Neural Network (RNN) and its variants (LSTM, GRU), Bayesian, NB, HMM etc.)	12
6	Object Entity Recognition, Question & Answering, Sequence to Sequence Models (Machine Translation, Summarization etc),	6
7	Convolutional Neural Network (CNN), RNN-CNN, Speech data analysis, Image Captioning, Text to Speech/audio, Text to image and Text to video	5
8	Applications and presentations	2

Lab Work	Implementation various approaches from data preprocessing to modelling. Project that focuses on various NLP applications.
Text Book:	*1. Speech and Language Processing 3rd Ed, by Dan Jurafsky and James H Martin* *2. Natural Language Processing, Jacob E* *3. A primer on Neural Network Models for NLP by Yoav Goldberg* *4. Deep Learning in Natural Language Processing by Li Deng, Yang Liu*
Video Lectures	*https://cs224d.stanford.edu/* *https://www.youtube.com/watch?v=OQQ-W_63UgQ (and series)* *https://www.youtube.com/watch?v=aeOLjFe256E (NPTEL)*
Conferences:	*WWW, KDD, SIGIR, ICDM, CIKM, TKDE, NIPS, ICML, ACL, UAI, IJCAI, AAAI, CVPR etc.*

Components of Course Evaluation	Percentage
Mid Term-1 Examination	20
Mid Term-2 Examination	20
End Term Examination	30
Quizzes, class assessment(discussion, presentations, attendance etc.)	30
Project (40), Lab Assignments (30), lab exams (30)	100
Total	**200**