K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May – June 2025

PhD Program: Academic Year 2024-25

Course Work Examination

Course Code: **PhD102** and Course Name: **Deep Learning for Natural Language Processing**

Date: 21-05-2025 Duration: 2.00 PM to 4.30 PM Max. Marks: 70

Instructions:
All questions are compulsory.

	Question	Max. Marks	CO	BT Level
Qu-1	Solve any **Six** questions out of **Eight.**	**30**		
i)	Explain N-gram model	5	1	U
ii)	Explain Word2Vec model for NLP	5	2	U
iii)	Compare and Contrast shallow and deep Neural Networks	5	3	U
iv)	Explain the significance of deep Learning in NLP?	5	4	U
v)	Explain the objectives of Self Supervised learning	5	5	U
vi)	Explain the database management approach of processing the data in text summarization.	5	6	U
vii)	Explain similarity vs plagiarism	5	4	U
viii)	Explain Machine translation system by taking example of google translation system	5	3	U
Qu-2	Solve any **TWO** questions out of **THREE.**	**20**		
i)	How do recurrent neural network language models (RNN LMs) capture long-range dependencies in text, and what challenges do they face in handling syntactic and semantic structures, especially in morphologically rich languages like those in India?	10	1	AP
ii)	How does the attention mechanism enhance sequence modeling in neural networks, and what are its advantages over traditional recurrence-based architectures, particularly for handling long-range dependencies in multilingual machine translation?	10	2	AP
iii)	How can self-supervised learning (SSL) objectives be designed to effectively capture both syntactic and semantic representations in multilingual contexts, particularly for low-resource Indian languages?	10	3	AP

Qu-3	Solve any **TWO** questions out of **THREE**.	**20**		
i)	Design a quantitative study to measure the impact of chain-of-thought prompting on reasoning accuracy in language models of varying architectural designs.	10	4	AP
ii)	Design a quantitative study to measure the impact of chain-of-thought prompting on reasoning accuracy in language models of varying architectural designs.	10	5	AP
iii)	How can spatial data methods be adapted in an NLP context to analyze geospatial question answering using Retrieval-Augmented Generation models?	10	6	AP

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