Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-801(B)	Generative Artificial Intelligence (AI)	PEC	3	3	0	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to: -	
CO1	Explain the foundational concepts of Generative Artificial Intelligence.
CO2	Analyze various AI based generative models and their applications.
CO3	Describe GANs and their applicability to various unsupervised learning problems.
CO4	Evaluate RNNs and LSTM models for sequential processing in Natural Language Processing.
CO5	Explore use of pre-trained language models including metrics for evaluating generative models.

Detailed Syllabus

Section-A

Unit 1: Introduction: Overview of Generative AI (GenAI) and its applications in various domains, Understanding the difference between generative and discriminative models, Taxonomy of generative models, GenAI modalities mappings. **(10 Hrs.)**

Unit 2: Generative Models: Fundamentals and Techniques, Introduction to basic generative models (Gaussian Mixture Models (GMMs) and Hidden Markov Models (HMMs)), Latent Variable Models, Statistical Language Models (SLM), Role of encoder and decoder networks. **(10 Hrs.)**

Unit 3: Generative Adversarial Networks (GANs): Introduction to GANs and the GAN framework, Generator-discriminator adversarial training process, Variants of GANs: Conditional GANs, Wasserstein GANs. Autoregressive Models (PixelCNN and PixelRNN architectures for image generation). **(10 Hrs.)**

Section-B

Unit 4: Sequence Generation and Transformers: Recurrent Neural Networks (RNNs), Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) cells, Introduction to Transformers: Motivation for Transformers and their advantages over RNNs, Transformer architecture: self-attention and feed-forward layers, multi-head attention mechanism. (**10 Hrs.)**

Unit 5: Language Generation with Transformers: Using pre-trained language models like GPT (Generative Pre-trained Transformer), Conditional language generation, Metrics and techniques for evaluating generative models. **(10 Hrs.)**

Textbooks

S.No	Name of the Suggested Books	Name of Author	Publisher Name	Edition (Pub. Yr.)
1	Generative AI with python	Joseph Babcock, Raghav Bali	Packt	1st (2021)
2	ChatGPT for Thought Leaders and Content Creators: Unlocking the	Dr. Gleb Tsipursky	Intentional Insights	1st (2023)

	Potential of Generative AI for Innovative and Effective.			

Reference Books

S.No.	Name of the Book	Name of Author	Publisher Name	Edition (Pub. Yr.)
1	Exploring Deepfakes	Bryan Lyon (Author), Matt Tora	Packt Publishing	1st (2023)