



BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE (A)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
BR25 M.TECH CSE COURSE STRUCTURE AND SYLLABUS

II Semester	GENERATIVE AI (D252BAA1) (PROFESSIONAL ELECTIVE-III)	L	T	P	C
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Course Objectives:

1. To learn Python and Tensor Flows skills for Generative AI.
2. To study techniques for cleaning and preparing data for Generative AI tasks.
3. To implement generative AI models
4. To develop innovative applications using generative AI tools and techniques.

Course Outcomes: At the end of the course, student will be able to (Four to Six)

		Knowledge Level(K)#
CO1	Implement Python and Tensor Flow basics, including data handling and Preprocessing techniques	K5
CO2	Implement Generative AI models such as GANs, VAEs, LSTM networks, And Transformer models for image text, and music generation tasks	K4
CO3	Evaluate model performance and experiment with hyper parameters and Optimization techniques to enhance Generative AI outcomes.	K6
CO4	Develop innovative applications in image, text, and music generation, Showcasing practical skills	K5

Based on suggested Revised BTL

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6
CO1	2		2	3	2	
CO2	3		3	3	3	1
CO3	3		3	3	3	2
CO4	3	2	3	3	3	3

(Please fill the above with Levels of Correlation, viz., L, M, H)

Dr.N.Rama Krishnaiah, Professor of CSE,UCEK & Control of Examination JNTUK, kakinada.	Dr.C.Krishna Mohan, Professor of CSE,IIT, Kandi, Hyderabad.	Dr.P.Radha Krishna, Professor of CWQSE,NI T, Warangal	Mr.Rajesh Bobburi Chief Operating Officer, HighQ Labs Private Limited, Rajahmundry	Dr.Lakshmi Haritha Medida, Associate Professor, R.M.K.Engineering College,Kavarai, Kavarai, Kavarai, Kavarai	Dr.K.Srinivas, Professor & HoD Department of CSE, B.V.C.I.T.S, Batlapalem
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UNIT	CONTENTS	Contact Hours
UNIT-1	Introduction To GenAi: Historical Overview of Generative modelling, Difference between Gen AI and Discriminative Modeling, Importance of generative models in AI and Machine Learning, Types of Generative models, GANs, VAEs, autoregressive models and Vector quantized Diffusion models, Understanding if probabilistic modeling and generative process, Challenges of Generative Modeling, Future of Gen AI, Ethical Aspects of AI, Responsible AI, UseCases	10Hrs
UNIT-2	Generative Models For Text: Language Models Basics, Building Blocks of Language models, Transformer Architecture, Encoder and Decoder, Attention mechanisms, enumeration of Text, Models like BERT	12Hrs

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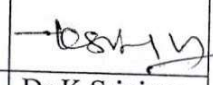
	and GPT models, Generation of Text, Auto encoding, Regression Models, Exploring Chat GPT, Prompt Engineering: Designing Prompts, Revising Prompts using Reinforcement Learning from Human Feedback (RLHF), Retrieval Augmented Generation, Multimodal LLM, Issues of LLM like hallucination	
UNIT- 3	Generation of Images: Introduction to Generative Adversarial Networks, Adversarial Training Process, Nash Equilibrium, Variational Auto encoders, Encoder-Decoder Architectures, Stable Diffusion Models, Introduction to Transformer-based Image Generation, CLIP, VisualTransformersViT-Dall-E2andDall-E3,GPT-4V,Issuesof Image Generation models like Mode Collapse and Stability.	12Hrs
UNIT- 4	Generation of Painting, Music, and Play: Variants of GAN, Types of GAN, Cyclic GAN, Using Cyclic GAN to Generate Paintings, Neural Style Transfer, Style Transfer, Music Generating RNN, Muse GAN, Autonomous agents, Deep Q Algorithm, Actor-critic Network.	12Hrs
UNIT- 5	Open Source Models And Programming Frameworks: Training and Fine tuning of Generative models, GPT 4 All, Transfer learning and Pre trained models, Training vision models, Google Copilot, Programming LLM, Lang Chain, Open Source Models, Llama, Programming for TimeS former, Deployment, Hugging Face.	12Hrs
Total		58Hrs

Text Books:

1. DenisRothman, "TransformersforNaturalLanguageProcessingandComputerVision", Third Edition , Packt Books, 2024

Reference Books:

1. DavidFoster, "GenerativeDeepLearning", O'ReilyBooks, 2024.
2. AltafRehmani, "GenerativeAIforEveryone", BlueRoseOne, 2024.

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