



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

GENERATIVE AI								
VIII Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
24X6654	PE	3	0	0	3	40	60	100
		Contact Classes: 45		Tutorial Classes: Nil		Practical Classes: Nil		Total Classes: 45
Prerequisites: Programming Skills								

Course Overview:

This course introduces the foundations and applications of Generative AI and Machine Learning. Students learn core AI/ML concepts, neural networks, and deep learning, and explore generative models such as GANs, VAEs, LLMs, and diffusion models. The course combines theory with hands-on work using TensorFlow and PyTorch to build and evaluate models for image, music, and text generation. It also covers ethical issues like bias, privacy, deepfakes, and copyright, and highlights real-world applications in art, healthcare, chatbots, gaming, and virtual reality.

Course Objectives:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of the C programming language.
4. To learn the usage of structured programming approaches in solving problems.

Course Outcomes: After Completion of the Course, Students should be able to

1. Understand the Fundamentals of Generative AI
2. Identify the performance of generative models using metrics
3. Analyze the ethical implications of generative AI
4. Apply algorithms to build and train generative models using frameworks
5. Compare the performance of various generative AI architectures

UNIT -1:

Introduction to AI and Machine Learning-Types of Generative Models (e.g., LLM,SLM,GANs, VAEs, Autoregressive Models)- Neural Networks: Basic Architecture, Backpropagation, Activation Functions-Deep Learning Basics and its Applications-Unsupervised vs. Supervised Learning

UNIT -2

Introduction to Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs)- Understanding the Generator-Discriminator

Architecture in GANs-Latent Space Representation and Loss Functions-
Training Strategies, Optimization, and Hyperparameter Tuning-Applications
and Case Studies in Image, Video, and Text Generation-Diffusion Models and
their Use in Modern AI Art Generation

UNIT -3

Introduction to TensorFlow and PyTorch for Generative AI Building GANs and
VAEs from Scratch Hands-on Projects: Generating Images, Music, and Text -
Model Evaluation Techniques (FID Score, Inception Score, BLEU Score) - Fine-
tuning Pretrained Models for Specialized Applications

UNIT -4

Ethical Challenges in AI: Bias, Fairness, and Accountability- Deepfakes and
Synthetic Media: Risks and Regulations - AI in Content Creation: Copyright,
Ownership, and Creativity - Data Privacy in Generative AI Systems - Bias and
Fairness in Training Data: Identifying and Mitigating

UNIT -5

AI in Digital Art and Content Creation - Music Generation Using Neural
Networks - Healthcare Applications: Drug Discovery and Medical Imaging -
Natural Language Generation (NLG) and Chatbots - Case Studies:
Generative AI in Gaming, Fashion, and Virtual Reality

TEXT BOOKS:

1. Gohil, P. (2019). Machine learning with Tensor Flow. BPB Publications.
2. Akerkar, R. (2020). Deep learning: A practitioner's approach. Springer.
3. Arora, R. (2021). Artificial intelligence: A guide for thinking humans. Wiley India Pvt. Ltd.
4. Schwab, K. (2017). The fourth industrial revolution (Indian edition). Penguin Random House India.

REFERENCE BOOKS:

1. Deep Learning – Ian Goodfellow, Yoshua Bengio, Aaron Courville
2. Generative Deep Learning – David Foster
3. Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow – Aurélien Géron
4. Deep Learning with Python – François Chollet
5. Python Machine Learning – Sebastian Raschka & Vahid Mirjalili
6. Responsible Artificial Intelligence – Virginia Dignum
7. Weapons of Math Destruction – Cathy O’Neil
8. AI Art: Machine Visions and Warped Dreams – Ahmed Elgammal
9. Speech and Language Processing – Daniel Jurafsky & James H. Martin

ELECTRONIC RESOURCES:

1. <https://www.geeksforgeeks.org/artificial-intelligence/generative-ai-tutorial/>
2. <https://getvm.io/tutorials/intro-to-deep-learning-and-generative-models-course-prof-sebastian-raschka>
3. <https://www.datacamp.com/tutorial/generative-adversarial-networks>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)