Introduction to Generative AI Models

23rd – 27th June 2025

Overview

Generative AI is reshaping the future of technology, unlocking unparalleled possibilities in content creation, automation, and problem-solving. From crafting realistic text, images, and videos to driving innovation in education, entertainment, and advanced research, this transformative technology is at the forefront of modern advancements. Unlike traditional AI, Generative AI uses cutting-edge neural networks and deep learning techniques to generate novel outputs based on abstract prompts, making it a versatile tool for diverse applications. Its journey, from the early days of rule-based chatbots to sophisticated models like GANs, Transformers, and Diffusion Models, exemplifies a remarkable evolution.

This comprehensive course provides participants with an in-depth understanding of Generative AI's fundamentals, its practical applications, and emerging trends. Through expert-led lectures, hands-on tutorials, and real-world case studies, you will explore the science and art behind creating intelligent, synthetic content while addressing key challenges like ethical use and detection of deepfakes.

Whether you are a professional, researcher, student, or academician, this course offers a unique opportunity to master the concepts and applications of Generative AI and become part of the technological revolution shaping tomorrow.

Objectives

The primary objectives of the course are as follows:

i) Exposing participants to the fundamentals of traditional AI and generative AI.
ii) Understanding the role of generative models in the field of Artificial Intelligence
iii) Hands on tutorials and lab exercises to understand the implementation of various generative AI models for content creation in text and images.
iv) Providing exposure to practical problems and their solutions, through case studies and live projects demonstrations in identifying and distinguishing original and fake content.
v) Understanding the evolution and future trends of Generative AI.
vi) Exploring ethical aspects of Generative AI.

About MNIT Jaipur

The Institute was jointly established in 1963 as Malaviya Regional Engineering College Jaipur by the Government of India and the Government of Rajasthan. Subsequently, on 26 June, 2002, the Institute was given the status of National Institute of Technology. On 15 August 2007, it was recognized as an Institute of National Importance through an Act of Parliament. The Institute is fully funded by the Ministry of Education (Shiksha Mantralaya), Government of India. MNIT Jaipur lies in the heart of the pink city, imaginatively laid out with a picturesque landscape of 317 acres. At present the Institute offers undergraduate and postgraduate courses (M.Tech./M.Sc./M.B.A./ M.Plan /M.Sc. & Ph.D) to more than 5000 students, in almost all leading fields of engineering & technology, architecture, management and sciences. Through its internationally renowned faculty, laboratories with state-of-the-art equipment and excellent infrastructure, the Institute is actively engaged in research, consultancy and developmental activities, besides imparting regular teaching.

About the Department of CSE

Department of Computer Science & Engineering came into existence in 1994. The first degree program offered by the Department was B.E. (Computer Engineering) in affiliation with the University of Rajasthan. The first batch graduated in 1998. Another degree programme, B.E. (Information Technology), was initiated in 2001. In January 2004, first admissions to the Ph.D. programme took place. In 2008, M.Tech. (Computer Science & Engineering) programme was initiated, whereas M.Tech. (Computer Science & Information Security) was started in 2016. At present, the Computer Science & Engineering Department is offering the following degree programmes: B.Tech. (Computer Science & Engineering), M.Tech. (Computer Science & Engineering), M.Tech. (Computer Science & Information Security), and Ph.D. Faculty at Computer Science & Engineering believes in open interaction with students, who are encouraged to participate in academic, research, and extracurricular activities. Students have never misplaced the trust put in them by the department and have done well in academics and industry alike.

Modules	**A: Generative AI Models : June 23 – June 27 2025** **Number of participants for the course will be limited to fifty.**
You Should Attend If…	▪ **You are a professional** working in technology, manufacturing, or research, seeking to integrate cutting-edge Generative AI techniques into your organization for innovative problem-solving and content creation. ▪ **You are a researcher or academician** eager to explore the evolution, applications, and ethical considerations of Generative AI, or planning to incorporate it into your ongoing or future research projects. ▪ **You are a student (BTech, MSc, MTech, PhD)** with a passion for artificial intelligence, looking to build expertise in advanced AI concepts, including GANs, Transformers, and Diffusion Models, to stand out in your academic and professional journey. ▪ **You are an engineer or developer** interested in mastering state-of-the-art AI frameworks and tools for implementing Generative AI solutions in diverse domains such as education, healthcare, entertainment, and more. ▪ **You are a decision-maker or innovator** aiming to understand how Generative AI can drive growth, streamline processes, and deliver creative solutions to modern challenges.

Fees	The participation fees for taking the course (including 18% GST) is as follows: • Participants from abroad : **US $200** • Participants from **Industry/ Research Organizations**: **INR 4720** • **Faculty Members** from Academic Institutions: **INR 3540** • **Research Scholars**: **INR 1180** The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. **Note:** There is no central registration on the GIAN portal (gian.iith.ac.in); registration will be managed directly by the hosting institute.
How to Register?	Register for the course by paying the Registration Fee through National Electronic Transfer (NEFT) as per the following details: **Name of Account Holder: "Registrar (Sponsored Research), MNIT Jaipur"** **Account No.: 676801700388** **Bank: ICICI Bank Ltd.** **Branch: MREC, Malaviya National Institute of Technology Jaipur** **IFSC Code: ICIC0006768** **MICR No. 302229031** After paying the Registration Fee, it is mandatory for the participants to register at the registration link: https://forms.gle/WwDcAhgcMGwYf9KY9 to complete the registration process. Seats for this course are limited and will be available on a **First Come First Served** basis. The course will be conducted in an offline mode at MNIT Jaipur campus and all participants will be provided a certificate. It is compulsory for participants to be present in 90% of the sessions and participate in all the assessments in order to receive the certificate.
Important Dates	**Registration begins** on **6th January, 2025**. **Last date for registration** is **23rd May, 2025.** Shortlisted participants will be informed by email by 25th May, 2025.
Accommodation	On-campus accommodation is available at the Institute Guest House on a **payable basis**, offering **twin-sharing AC rooms** at **₹550 per person per day**. Accommodation is limited and will be allotted on a **first-come, first-served basis**. Please select the relevant option in the **Google registration form** to avail this facility. An alternative nearby accommodation option is the **Red Fox Hotel (Lemon Tree Hotels)**. Participants may choose to book rooms **directly with the hotel** on a **payment basis** as per their convenience.

How to Reach MNIT Jaipur?	Jaipur is well connected to all main cities in India by road, railways and air services. MNIT Jaipur is situated on Jawaharlal Nehru (JLN) Marg and is approx. 10 kms away from the Jaipur Junction Railway Station and the Jaipur Central Sindhi Camp Bus Stand. Jaipur International Airport is approx. 3 kms away from the Institute. For more details, please check: https://mnit.ac.in/footer/howtoreach

Course Contents

Day	Session Type	Topic	Instructor(s)
Day 1	Lecture 1	Introduction to AI and Neural Networks	Dr. Kiran Raja
	Lecture 2	Training and Evaluating Generative Models	Dr. Kiran Raja
	Lecture 3	Generative AI Concepts and Applications	Dr. Kiran Raja
Day 2	Tutorial 1	Interactive Session and Lab on Neural Networks	Dr. Neeta Nain, Dr. Mahipal Jadeja
	Lecture 4	Variational Autoencoders	Dr. Kiran Raja
	Lecture 5	Generative Adversarial Networks and Diffusion Models	Dr. Kiran Raja
	Lecture 6	Key Generative Models and Architectures	Dr. Kiran Raja
Day 3	Tutorial 2	Lab on GANs and Applications in Text, Audio, and Video Generation	Dr. Neeta Nain, Dr. Mahipal Jadeja
	Lecture 7	Transformers and Attention Mechanisms	Dr. Kiran Raja
	Lecture 8	Detection of Synthetic Content and Ethical Considerations	Dr. Kiran Raja
Day 4	Tutorial 3	Lab on Recurrent Neural Networks	Dr. Neeta Nain, Dr. Mahipal Jadeja
	Lecture 9	Applications in Face Recognition and Data Augmentation	Dr. Kiran Raja
	Lecture 10	Morphing: Generation and Detection	Dr. Kiran Raja
	Tutorial 4	Advanced Lab on Face Recognition and Morphing Detection	Dr. Neeta Nain, Dr. Mahipal Jadeja

	Day 5	Lecture 11	Presentation Attack Detection	Dr. Kiran Raja
		Lecture 12	Explainability and Ethics in Generative AI	Dr. Kiran Raja
		Lecture 13	Age Invariant Face Recognition	Dr. Neeta Nain
		Tutorial 5	Exam and Feedback Session	Dr. Neeta Nain, Dr. Mahipal Jadeja

FACULTY

Dr. Kiran Raja is a member of faculty at the Department of Computer Science, Faculty of Information Technology and Electrical Engineering at Norwegian University of Science and Technology (NTNU), University, Norway. His main research interests include statistical pattern recognition, image processing, and machine learning with applications to biometrics, security and privacy protection. He was/is participating in EU projects SOTAMD, iMARS and other national projects. He has successfully collaborated with faculties from national and international universities. Within EU-H2020 iMARS project, his focus has been on generation and detection of attacks on biometrics systems. His works have exploited the advancements in Generative Adversarial Networks to create morphing attacks to improve resilience of biometric systems. Within the euLISA project, he was also involved in creating synthetic identities for training large scale biometric systems. He also works as a consultant for various national agencies within Norway. His works have been recognized and bagged positions at conferences and workshops of repute like Computer Vision and Pattern Recognition Conference (CVPR), Int. Conf. of the Biometrics Special Interest Group (BIOSIG), IEEE Int. Conf. on Biometrics: Theory, Applications and Systems (BTAS), IAPR/IEEE-IWBF, IEEE-ISBA, ACM-SIN etc.

Kiran Raja is also an appointed member of NTNU Pedagogic Academy and was also awarded excellent teaching practitioner at NTNU in 2023. He has been involved in number of conferences as program committee member, program chair and publications chair. He also serves as a reviewer and editor in number of journals. He is the senior member of IEEE and Section Chair of IEEE Norway. Further, he is a member of the European Association of Biometrics (EAB) and chairs the Academic Special Interest Group at EAB.

Course Coordinators

Dr. Neeta Nain's research encompasses machine learning, biometrics, and computer graphics. With over 80 publications in reputed journals and conferences, she has guided multiple PhD and MTech students. As an organizer of several international conferences and workshops, Dr. Nain brings a wealth of experience in bridging theory and practice in AI education.

Dr. Mahipal Jadeja specializes in Theoretical Computer Science, Graph Neural Networks, and Generative AI in Education. He has presented at prestigious international conferences, published extensively, developed a highly-rated MOOC on Python Programming, and runs the YouTube channel "CS Simplified," with more than 150 academic videos. He actively explores AI's transformative potential in education and content creation.

Course Coordinators

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Registration link:
https://forms.gle/WwDcAhgcMGwYf9KY9

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