# PMRF-ISSS Teaching Programme

Prime Minister Research Fellowship students' teaching requirement facilitated by the Institute of Smart Structures and Systems

Module PMRF-ISSS0##

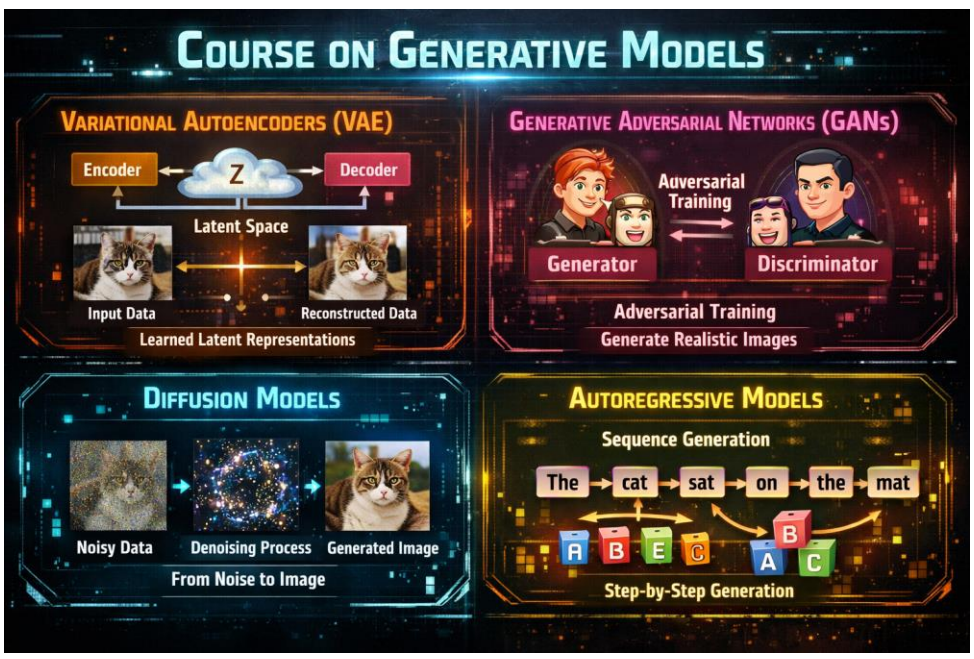
# Introduction to Generative Models

**Name of the PMRF student**

Mainak Biswas

**Required background of the students taught**

Linear Algebra
Probability and Statistics
Basics of Machine and Deep Learning
Basics of Multivariate Calculus – like gradients
Basics of Optimisation: Gradient Descent
Basic Python coding




*Generated by ChatGPT (let's learn how it does it)

**Details of the content of the module**

Module 1: Likelihoods, Mixture Models, EM

Module 2: Variational Inference, Latent Variable models

Module 3: Variational Autoencoders

Module 4: Diffusion Models, Energy-based Models, Flow Models

Module 5: Adversarial Learning-based Generative Modelling

Module 6: Autoregressive Models

Model 7: Recognition Parametrised Probabilistic Models (RPMs) – optional

Recorded/Live Sessions will be uploaded/conducted. We will concentrate on the mathematics behind these state-of-the-art models. We will see demonstrations in Python, and 2 assignments and solutions will be uploaded for problem-solving.

**Schedule of the module**

Start Date: between 25th April – 2nd May

End Date: between 30th May – 15th June

Timings: Live Session (doubt clearing at weekends), 3-4 lectures uploaded every week (total ~12 lectures of around 2-2.5 hours)

Meeting link: Will be shared later (will make a Teams channel and add participants

Contact email ID: isss.forum@gmail.com

Registration link: https://forms.gle/w6MpDdHWcHK2hVDi6