

Module PMRF-ISSS056/2023

## Deep Learning Theory

### Name of the PMRF student

Nishanth Shetty

### Required background of the students taught

Any engineering discipline is welcome!  
Exposure to calculus, probability theory  
and linear algebra is necessary.

### Details of the content of the module

1. Statistical Learning Theory - Introduction, The Bayes Decision Function, Empirical Risk Minimization, Constrained ERM
2. Basics of Deep Learning - Universal Function Approximation, Regularisation, Model Architectures.
3. Optimizers - Stochastic Gradient Descent, Adam, Polyak Heavy Ball Momentum, Nesterov's Momentum.
4. Convolutional Neural Networks- Convolution operation, Pooling, inductive bias, weight sharing, receptive field
5. Autoencoders - undercomplete, regularized.
6. Generative Models - Score-Based Generative Models, Diffusion Models, VAEs

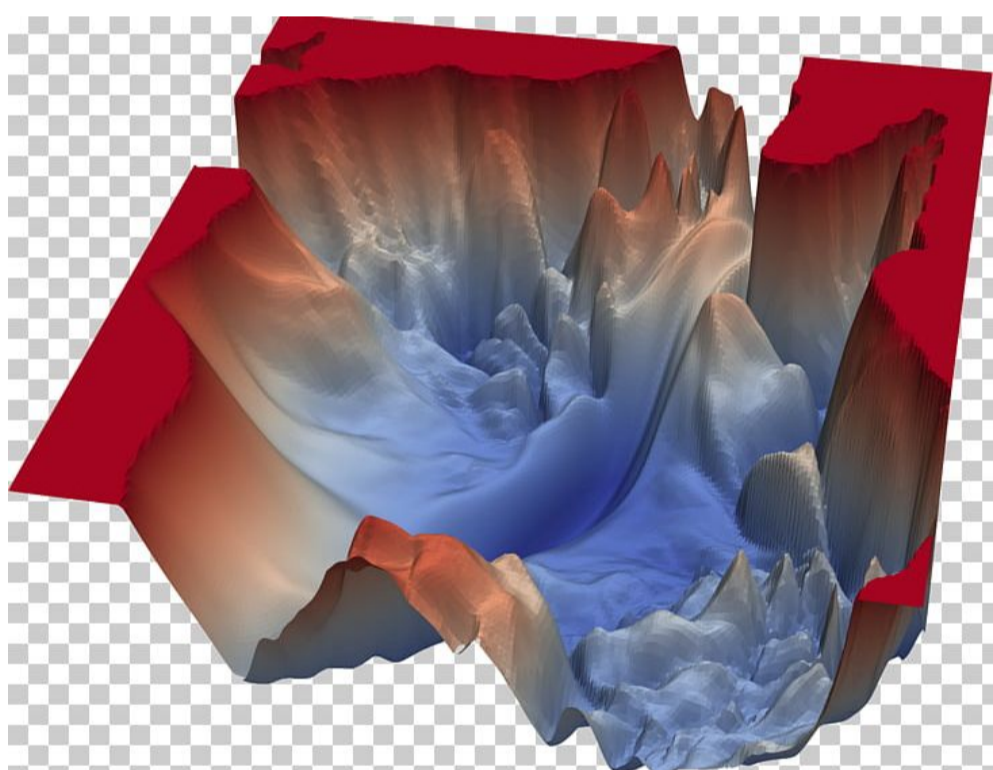


Image Courtesy: <https://tinyurl.com/2b43upmj>

### Schedule of the module

**Start date:** 13th October, 2023

**End date:** 5th November, 2023

**Lecture:** Every day morning 07:00 to 08:30

**Total Lecture hours:** 36 hours

Meeting link : Will be shared later

[Link](#)

Contact email ID: [issf.forum@gmail.com](mailto:issf.forum@gmail.com)

Registration link:

<https://forms.gle/nyK7FY2i6cmTMQSt7>