

# Winter School on Deep Learning: From Perceptrons to Transformers

21st January - 12th March, 2022 (Fridays and Saturdays)

Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata

[www.isical.ac.in/~ecsu/?q=node/106/](http://www.isical.ac.in/~ecsu/?q=node/106/), [www.sites.google.com/view/wsd2022/](http://www.sites.google.com/view/wsd2022/)

## Call for Participation

### Chief Patron

Sanghamitra Bandyopadhyay

### Advisory Committee

Bhabatosh Chanda  
Dipti Prasad Mukherjee  
Utpal Garain  
Debapriyo Majumdar  
Pinakpani Pal  
Naqeeb Ahmad Warsi

### Program Chair

Swagatam Das

### Program Coordinator

Partha Pratim Mohanta

### Organizing Chairs

Bikash Santra  
Avishek Gupta

### Speakers

Professors, Scientists,  
Post-docs and Research  
Scholars from ISI, other  
eminent institutions and  
R&D labs.

### Organizing Committee

Faizanuddin Ansari  
Aditya Panda  
Kushal Bose  
Anal Roy Chowdhury  
Suman Ghosh  
Suvra Jyoti Choudhury  
Suchismita Das  
Samriddha Sanyal  
Nasib Ullah  
Sandip Paul  
Sreya Ghosh  
Susmita Ghosh  
Turbasu Biswas  
Debapriya Roy  
Rajat Kanti Chatterjee  
Dilip Kumar Gayen  
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**The Objective:** The Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata is organizing the *Winter School on Deep Learning: From Perceptrons to Transformers*. This winter school will focus heavily on imparting a **hands-on experience** towards developing a wide range of classical and advanced deep learning models, in addition to making the associated theory easy to understand. Participants will learn from the basics of machine learning to the advanced deep learning-based approaches with application to Computer Vision and Natural Language Processing. Theoretical lectures will be delivered by renowned professors and scientists (from ISI and other esteemed organizations) who have made significant contributions in their areas of research. The lectures will be supplemented by **extremely detailed hands-on sessions** instructed by post-docs and research scholars.

**Course coverage:** The winter school will have the following course structure (theory and associated hands-on)

- ❖ Basics of Python
- ❖ Basics of the Deep Learning Library: PyTorch
- ❖ Essentials of Vector Calculus and Linear Algebra for Machine Learning
- ❖ Conceptual Fundamentals of Machine Learning, Image Processing, Computer Vision, Natural Language Processing
- ❖ Perceptrons and Backpropagation
- ❖ Ingredients of Deep Learning: Gradient Descent, Batch Normalization, Regularization, Dropout
- ❖ Convolutional Neural Networks (CNN), Convolutional Autoencoders
- ❖ CNN for Object Classification, Detection, and Segmentation
- ❖ Recurrent Neural Network, LSTM, Word Embedding
- ❖ Attention Models and Transformer (BERT and Visual Transformer)
- ❖ Deep Generative Models (GAN and VAE)
- ❖ Weakly Supervised Deep Learning, Self-Supervised Learning
- ❖ Meta-Learning and Few-Shot Learning
- ❖ Deep Reinforcement Learning
- ❖ Explainable Artificial Intelligence
- ❖ Geometric Deep Learning

**Mode of tutorials:** Lectures and Hands-on sessions will be conducted in **online mode only**. All sessions will be on **Fridays** and **Saturdays**, and the recordings will be shared with all the participants.

**Who can apply?** Professionals from academia and industry, research/project scholars, masters and final-year bachelors students. Interested candidates must submit the online application (<https://sites.google.com/view/wsd2022/apply>). Selected applicants will be informed to register for the school.

<b>Important Dates:</b>	Submit Application on Website	<b>Dec 28, 2021 – Jan 12, 2022</b>
	Notification to Selected Applicants	<b>Jan 13, 2022</b>
	Registration	<b>Jan 14 – Jan 17, 2022</b>
	Course Duration	<b>Jan 21 – Mar 12, 2022</b>

**For application, registration fees and other details:** [www.isical.ac.in/~ecsu/?q=node/106/](http://www.isical.ac.in/~ecsu/?q=node/106/)  
[www.sites.google.com/view/wsd2022/](http://www.sites.google.com/view/wsd2022/)