Micro Syllabus

Unit No	Contents	Mapped CO
I	• **Fundamentals of Deep Networks** ➢ Defining Deep Learning ➢ What Is Deep Learning • **Common Architectural Principles of Deep Networks:** ➢ Parameters, Layers ➢ Activation Functions [Linear Function, Sigmoid Function, Tanh Function, Rectified Linear Unit, Leaky ReLU] ➢ Loss Functions ➢ Loss Vs Accuracy Measures ➢ Hyper parameters.	CO1
II	• **Building Blocks of Deep Networks** ➢ RBMs ➢ Phases of RBF ➢ Applications of RBF ➢ Autoencoders ➢ Hyper parameters of Autoencoders ➢ Variational Autoencoders. • **Major Architectures of Deep Networks** ➢ Unsupervised pretrained networks ➢ Deep Belief Networks ➢ Generative Adversarial Networks.	CO1, CO2, CO4
III	• **Convolutional Neural Networks (CNNs)** ➢ The Convolution Operation, ➢ Motivation ➢ Pooling ➢ Convolution and Pooling as an Infinitely Strong Prior ➢ Variants of the Basic Convolution Function ➢ Structured Outputs ➢ Data Types ➢ Efficient Convolution Algorithms ➢ Random or Unsupervised Features ➢ The Neuroscientific Basis for Convolutional Networks, Applications.	CO1, CO3, CO4
IV	• **Sequence Modeling – Recurrent and Recursive Nets** ➢ Unfolding Computational Graphs ➢ Recurrent Neural Networks ➢ Encoder-Decoder Sequence-to-Sequence Architectures ➢ Deep Recurrent Networks ➢ Recursive Neural Networks ➢ The Long Short-Term Memory and Other Gated RNNs, and Applications.	CO1, CO3, CO4

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V	• **Deep Learning applications** ➢ Computer Vision. ➢ Speech Recognition. ➢ Natural Language Processing. ➢ Other Applications.	CO1, CO3, CO4

Learning Resources

Text books

1. Josh Patterson and Adam Gibson, —Deep learning: A practitioner's approachl, O'Reilly Media, First Edition, 2017.
2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, —Deep Learningl, MIT Press, 2016.
3. Deep learning,Amit Kumar Das,Saptarsi Goswami, Pabitra Mitra, Amlan Chakrabarti, First Edition,2021, Pearson.

References

4. Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O_Reilly, Shroff Publishers, 2019.
5. Deep learning Cook Book, Practical recipes to get started Quickly, Douwe Osinga, O_Reilly, Shroff Publishers, 2019.
6. Deep learning Illustrated A Visual Interactive Guide to Artificial Intelligence,Jon Krohn,Grant Beyleveld,Aglae Bassens,First Edition,2020, Pearson.

e-Resources and other Digital Material

1. https://www.deeplearningbook.org/
2. https://onlinecourses.nptel.ac.in/noc20_cs62/preview
3. https://www.udemy.com/share/101X6W/ (or) https://www.udemy.com/course/deep-learning-advanced-nlp/
4. https://www.youtube.com/watch?v=5tvmMX8r_OM&list=PLtBw6njQRU-rwp5_7C0oIVt26ZgjG9NI

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