Please note that we use Coursera materials, if you don't have an account please use the uploaded videos using the link to google drive or to google albums.

## **Basic theory**

1. Perceptron: HSE course video [coursera link](https://www.coursera.org/learn/intro-to-deep-learning/lecture/yy1NV/multilayer-perceptron-mlp), [google album](https://photos.app.goo.gl/DuMohXVCuofAiK97A), [google drive link](https://drive.google.com/drive/folders/1Ngim9lEF2qboTKwkipT_-CExIE59q_F1?usp=sharing)
2. Chain Rule: HSE course video [coursera link](https://www.coursera.org/learn/intro-to-deep-learning/lecture/rK0tw/chain-rule), [google album](https://photos.app.goo.gl/DuMohXVCuofAiK97A), [google drive link](https://drive.google.com/drive/folders/1Ngim9lEF2qboTKwkipT_-CExIE59q_F1?usp=sharing)
3. Backpropagation: HSE course video [coursera link](https://www.coursera.org/learn/intro-to-deep-learning/lecture/CxUe5/backpropagation), [google album](https://photos.app.goo.gl/DuMohXVCuofAiK97A), [google drive link](https://drive.google.com/drive/folders/1Ngim9lEF2qboTKwkipT_-CExIE59q_F1?usp=sharing)
4. Backpropagation effective implementation tips: HSE course videos
   * coursera [[link 1](https://www.coursera.org/learn/intro-to-deep-learning/lecture/P3VH6/efficient-mlp-implementation),  [link 2](https://www.coursera.org/learn/intro-to-deep-learning/lecture/YTunl/other-matrix-derivatives)], [google album](https://photos.app.goo.gl/99HfePreHP1evGob9), [google drive link](https://drive.google.com/drive/folders/1z30pLbTgOLnMSEv8gW_6hnyLZi6CtKRZ?usp=sharing)
5. Regularization: D.AI course videos"Regularizing your neural network" [coursera link](https://www.coursera.org/learn/deep-neural-network/home/week/1), [google album link](https://photos.app.goo.gl/5HNUR6Xohy9ir5CL9), [google drive link](https://drive.google.com/drive/folders/1UxM6XSNF-dPxl5jCKPjFfERMVhZ3I5Vy?usp=sharing)
6. Optimization
   * D.AI course video: "Setting up your optimization problem" [coursera link](https://www.coursera.org/learn/deep-neural-network/home/week/1), [google album link](https://photos.app.goo.gl/FpB4gYNrsYPqAJ3f9), [google drive link](https://drive.google.com/drive/folders/1A5qSYc5BeKMH6C7J5VgGAHDluEU8wHar?usp=sharing)
   * post [Recommendations for Deep Learning Neural Network Practitioners](https://machinelearningmastery.com/recommendations-for-deep-learning-neural-network-practitioners/)
   * post [An overview of gradient descent optimization algorithms](https://ruder.io/optimizing-gradient-descent/)
   * post [How to choose an activation function for deep learning?](https://machinelearningmastery.com/choose-an-activation-function-for-deep-learning/)
7. Mini-batch GD D.AI course video [coursera link](https://www.coursera.org/learn/deep-neural-network/lecture/qcogH/mini-batch-gradient-descent), [google album link](https://photos.app.goo.gl/nzGLmfsGSvX2WLDdA), [google drive link](https://drive.google.com/drive/folders/1_Hdv2jFbGeUrakCoeKi15JxHw61nCNpR?usp=sharing)
8. Batch normalization [post](https://machinelearningmastery.com/batch-normalization-for-training-of-deep-neural-networks/)

Additional but helpful for high-level understanding

* NN philosophy HSE course video course [link [1](https://www.coursera.org/learn/intro-to-deep-learning/lecture/mNROM/what-deep-learning-is-and-is-not), link [2](https://www.coursera.org/learn/intro-to-deep-learning/lecture/RYPZe/deep-learning-as-a-language)], [google album link](https://photos.app.goo.gl/jmW46vTPck2sz2o97), [google drive link](https://drive.google.com/drive/folders/1puLMs25TPE3T5ndXVQmteq-neFkoFOCh?usp=sharing)

## **Practical guides**

Please, choose one of them, you have not to study all frameworks in one week.

### **Tensorflow / Keras**

* [TensorFlow 2 Tutorial: Get Started in Deep Learning With tf.keras](https://machinelearningmastery.com/tensorflow-tutorial-deep-learning-with-tf-keras/)
* [Hands-On Computer Vision with TensorFlow](https://drive.google.com/file/d/1oL0ROcuCbkw3qYordlj8muehNnV0oBDr/view?usp=sharing) (chapters 2-3, optional chapter 4)

### **PyTorch**

* [A Gentle Introduction to PyTorch 1.2](https://medium.com/dair-ai/pytorch-1-2-introduction-guide-f6fa9bb7597c)
* [The ABCs of PyTorch in 4 Minutes](https://medium.com/towards-artificial-intelligence/pytorch-in-2-minutes-9e18875990fd)
* [Deep Learning with PyTorch](https://canvas.instructure.com/courses/2029103/files/97772140/download?wrap=1) (chapters 2-3, optional 85-106)

## **Basic Computer Vision**

* [Intuitively Understanding Convolutions for Deep Learning](https://towardsdatascience.com/intuitively-understanding-convolutions-for-deep-learning-1f6f42faee1)
* [Convolutions examples](https://aishack.in/tutorials/image-convolution-examples/)
* [Dilated Convolution](https://towardsdatascience.com/understanding-2d-dilated-convolution-operation-with-examples-in-numpy-and-tensorflow-with-d376b3972b25)
* [How to Configure Image Data Augmentation in Keras](https://machinelearningmastery.com/how-to-configure-image-data-augmentation-when-training-deep-learning-neural-networks/)
* [An Intuitive Explanation of Convolutional Neural Networks](https://ujjwalkarn.me/2016/08/11/intuitive-explanation-convnets/)
* [It all started with— CNN’s & AlexNet](https://medium.com/@adityaraj_64455/it-all-started-with-cnns-alexnet-3023b21bb891)

## **Additional**

* [Network types](https://towardsdatascience.com/the-mostly-complete-chart-of-neural-networks-explained-3fb6f2367464)