**Course Details:**

Phase 1 will cover these topics:

| Ph | Topic | Details | Pts | Week |
| --- | --- | --- | --- | --- |
| 1 | Background & Basics | Machine Learning Intuition, Background & Basics | 200 | Week 1 |
| 1 | Python Basics | Python 101 for Machine Learning | 500 | Week 1 & 2 |
| 1 | Neural Network Concepts | Convolutions, Pooling Operations & Channels | 500 | Week 2 |
| 1 | Pytorch Basics | Pytorch 101 for Vision Machine Learning | 500 | Week 2 & 3 |
| 1 | First Neural Networks | Kernels, Activations and Layers | 500 | Week 3 |
| 1 | Architectural Basics | A session where we go through 9 different steps before we arrive at the final architecture "suitable for our objective" | 1000 | Week 4 |
| 1 | Receptive Field | The CORE fundamental concept behind VM Program | 1000 | Week 5 |
| 1 | BN, Kernels & Regularization | Mathematics behind BN, Kernel Initialization and Regularization | 1000 | Week 6 |
| 1 | Back-prop & Advanced Convolutions | Advanced Convolutions & Pooling operations with Code examples and usage | 1000 | Week 7 |
| 1 | Data Augmentation | Advanced Image Augmentation Techniques, benchmarks against different techniques | 1000 | Week 8 |
| 1 | DNN Interpretability | Class Activation Maps - The most powerful debugging tool at your disposal | 1000 | Week 9 |
| 1 | Advanced Training Concepts | Optimizers, LR Schedules, LR Finder & Loss Functions | 1500 | Week 10 |
| 1 | Super Convergence | Cyclic Learning Rates, One Cycle Policy, and TFRecords | 2000 | Week 11 |
| 1 | ResNets | Training ResNet for TinyImageNet from scratch | 4000 | Week 12 & 13 |
| 1 | Inception and DenseNet | Understanding Inception and DenseNet Architectures | - | Week 13 |
| 1 | Object Detection Concepts | Understanding YOLOV2 Loss Function | 2000 | Week 14 |
| 1 | Object Detection Training | Implementing Object Detection Training & Transfer Learning | 4000 | Week 14 & 15 |
| 1 | MaskRCNN Family | RCNN, Fast-RCNN, FasterRCNN & MaskRCNN | - | Week 15 |
|  |  | PHASE 2 QUALIFICATION EXAM - 20000Pts |  | Week 16-18 |

**Links:**

1. Estimating an Optimal Learning Rate for a Deep Neural Network

<https://towardsdatascience.com/estimating-optimal-learning-rate-for-a-deep-neural-network-ce32f2556ce0>

# Epoch vs Batch Size vs Iterations

<https://towardsdatascience.com/epoch-vs-iterations-vs-batch-size-4dfb9c7ce9c9>

Quiz

1. <https://www.analyticsvidhya.com/blog/2017/08/skilltest-deep-learning/>

**Dropout**

1. <https://towardsdatascience.com/simplified-math-behind-dropout-in-deep-learning-6d50f3f47275>
2. **Google Colab tips to use**

<https://medium.com/deep-learning-turkey/google-colab-free-gpu-tutorial-e113627b9f5d>