

[View Full Course Details including Latest Schedule Online](#)

## PYTHON

# Python Deep Learning

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## Course Overview

This 5 day, instructor led course is designed for ISEA engineers and operation research analysts who need the software engineering skillset: particularly research and development engineers and analysts. The engineers will be using the software skillset to write deep learning scripts for CBM+, data analysis, ship data, etc. At conclusion of training students will be more proficient with:

- Basic Python programming
- How to use Numpy and Matplotlib in the context of deep learning.
- How to use Jupyter Notebook with a remote server.
- The principles and practices of supervised learning and deep learning.
- How to use neural networks to solve regression and classification problems.
- How to use unsupervised learning for visualization and dimensionality reduction.
- How to use convolutional neural networks for image classification. • How to use TensorFlow, TensorBoard, and Keras.
- How to optimize and tune the performance of deep neural networks.
- How to prepare datasets and manage the process around deep learning.
- Deep learning concepts and techniques in current use such as gradient descent algorithms, learning curves, regularization, dropout, batch normalization, the Inception architecture, and residual networks.

## Schedule

DATE	LOCATION	
<b>6/20/22 - 6/24/22 (5 days)</b> 8:00AM - 5:00PM	<b>Tysons Corner, VA</b> <a href="#">Open</a>	<a href="#">Contact Us</a>



DATE	LOCATION	
<b>6/20/22 - 6/24/22 (5 days)</b> 8:00AM - 5:00PM	<b>Live Online</b> <a href="#">Open</a>	<a href="#">Contact Us</a>
<b>6/20/22 - 6/24/22 (5 days)</b> 8:00AM - 5:00PM	<b>Columbia, MD</b> <a href="#">Open</a>	<a href="#">Contact Us</a>
<b>9/12/22 - 9/16/22 (5 days)</b> 8:00AM - 5:00PM	<b>Columbia, MD</b> <a href="#">Open</a>	<a href="#">Contact Us</a>
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<b>12/05/22 - 12/09/22 (5 days)</b> 8:00AM - 5:00PM	<b>Tysons Corner, VA</b> <a href="#">Open</a>	<a href="#">Contact Us</a>
<b>12/05/22 - 12/09/22 (5 days)</b> 8:00AM - 5:00PM	<b>Live Online</b> <a href="#">Open</a>	<a href="#">Contact Us</a>
<b>12/05/22 - 12/09/22 (5 days)</b> 8:00AM - 5:00PM	<b>Columbia, MD</b> <a href="#">Open</a>	<a href="#">Contact Us</a>

## Course Outline

### Part I

#### Module 1: The Foundations of Machine Learning

- Advantages of Machine Learning
- Disadvantages of Machine Learning
- Subjects Involved in Machine Learning
  - Statistics
  - Brain Modeling
  - Adaptive Control Theory
  - Psychological Modeling
  - Artificial Intelligence
  - Evolutionary Models
- Programming Languages
  - R
  - Python



## **Module 2: Machine Learning Models**

- Supervised Machine Learning
- Unsupervised or Reinforcement Learning
- How to Evaluate Machine Learning Models

## **Module 3: An Introduction to Neural Networks**

- Historical Background
- Why Use Neural Networks?
- Neural Networks vs. Conventional Computers
- Types of Neural Networks
  - Fully Connected Neural Network
  - Feed-Forward Networks
  - Convolutional Neural Networks
  - Feedback Networks
  - Perceptrons
  - Recurrent Neural Networks
  - Generative Adversarial Network

## **Module 4: An Introduction to Deep Learning**

- Supervised Modes
- Unsupervised Modes
- How to Obtain Impressive Results Using Deep Learning
- Examples of Deep Learning
- Automated Driving
- Defense and Aerospace
- Medical Research
- Industrial Automation
- Electronics
- How Does Deep Learning Work?
- Why Deep Learning is Better Than Traditional Learning Methods
- Choosing Between Deep Learning and Machine Learning

## **Module 5: How to Create and Train Deep Learning Models**

- Training from Scratch
- Transfer Learning
- Feature Extraction

## **Module 6: Applications of Deep Learning**

- Recognize applications of deep learning.

## **Module 7: Activation Functions Used to Develop Deep Learning Models**

- Popular Activation Functions



- Choosing the Right Activation Function

## Part II

### Module 8: An Introduction to Python

- Running Python
- Installing on Windows
- Installing on Other Systems
- Choosing the Right Version
- Python Keywords
- Understanding the Naming Convention
- Creating and Assigning Values to Variables
- Recognizing Different Types of Variables
- Working with Dynamic Typing
- The None Variable
- Computers Only Take Zeros and ones
- Deep Learning Libraries in Python.

### Module 9: How to Clean Data Using Python

- Dropping Columns in a Data Frame
- Changing the Index of a Data Frame
- Tidying up Fields in the Data
- Cleaning the Entire Data Set Using the `applymap()`.

### Module 10: How to Manipulate Data Using Python

- Starting with Numpy
  - Creating Arrays
  - Array Indexing
  - Array Slicing
  - Array Concatenation

### Module 11: Python Environment for Deep Learning

- Installation of Keras, TensorFlow, and Theano

### Modul 12: Regression Problem Using Keras

- Develop the Baseline Model
- Modeling a Standardized Data Set
- Tune the Network Typology
- Evaluate a Deeper Network Topology
- Evaluate a Wider Network Topology



## **Module 13: How to Develop a Neural Network in Python using Keras**

- Load Data
- Define the Model
- Compile the Model
- Fit the Model
- Evaluate the Model
- Tie It All Together
- Make Predictions

## **Module 14: How to Evaluate the Performance of a Deep Learning Model**

- Empirically Evaluate Network Configurations
- Data Splitting
- Manual K-Fold Cross Validation

## **Module 15: How to Save and Load Deep Learning Models**

- Save Your Neural Network Model to JSON
- Save Your Neural Network Model to YAML

## **Module 16: Reducing Dropouts in Deep Learning Models**

- Dropout Regularization for Neural Networks
- Regularizing Dropouts in Keras
  - Using Dropout on Visible Layers
  - Using Dropout on Hidden Layers
- Tips for Using Dropout

# **Python Deep Learning Training FAQs**

## **What is the recommended experience for this course?**

Class participants should have experience in object-oriented programming or at the minimum understand the principles of object-oriented programming. Attendees should have taken a college-level algebra course, which covered the following:

- Continuous functions of one or more variables
- Linear and non-linear functions
- Exponential functions
- Basic differential calculus
- Basic statistics
- Basic linear algebra



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301-258-8200 | [Sales@PhoenixTS.com](mailto:Sales@PhoenixTS.com) | [www.PhoenixTS.com](http://www.PhoenixTS.com)

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Starting at **\$2,900**

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**GSA**



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