

Neural Networks and Deep Learning

by DeepLearning.AI

About this Course

In the first course of the Deep Learning Specialization, you will study the foundational concept of neural networks and deep learning.

By the end, you will be familiar with the significant technological trends driving the rise of deep learning; build, train, and apply fully connected deep neural networks; implement efficient (vectorized) neural networks; identify key parameters in a neural network's architecture; and apply deep learning to your own applications.

The Deep Learning Specialization is our foundational program that will help you understand the capabilities, challenges, and consequences of deep learning and prepare you to participate in the development of leading-edge AI technology. It provides a pathway for you to gain the knowledge and skills to apply machine learning to your work, level up your technical career, and take the definitive step in the world of AI.

[Show less](#)



Taught by: **Andrew Ng**, Instructor
Founder, DeepLearning.AI & Co-founder, Coursera



Taught by: **Kian Katanforoosh**, Senior Curriculum Developer
Founder, Workera



Taught by: **Younes Bensouda Mourri**, Curriculum developer
Computer Science

Basic Info	Course 1 of 5 in the Deep Learning Specialization
Level	Intermediate
Commitment	At the rate of 5 hours a week, it takes roughly 5 weeks to finish each course in the Specialization.
Language	English, Subtitles: Chinese (Traditional), Arabic, French, Bengali, Ukrainian, Chinese (Simplified), Greek, Italian, Portuguese (Brazil), Vietnamese, Dutch, Korean, Oriya, German, Pashto, Urdu, Russian, Thai, Indonesian, Swedish, Turkish, Azerbaijani, Spanish, Dari, Hindi, Japanese, Kazakh, Hungarian, Polish
How To Pass	Pass all graded assignments to complete the course.
User Ratings	Average User Rating 4.9

Syllabus

Week 1

Introduction to deep learning

Be able to explain the major trends driving the rise of deep learning, and understand where and how it is applied today.

7 videos, 3 readings

- Reading:** Announcement: Deep Learning Specialization has been Updated!
- Video:** [Welcome](#)
- Video:** What is a neural network?
- Video:** Supervised Learning with Neural Networks
- Video:** Why is Deep Learning taking off?
- Video:** About this Course
- Reading:** Frequently Asked Questions
- Video:** Course Resources
- Reading:** How to use Discussion Forums
- Video:** Geoffrey Hinton interview

[Show less](#)

Graded: Introduction to deep learning

Week 2

Neural Networks Basics

Learn to set up a machine learning problem with a neural network mindset. Learn to use vectorization to speed up your models.

19 videos, 7 readings

- Video:** [Binary Classification](#)
- Video:** Logistic Regression
- Reading:** Clarification about Upcoming Logistic Regression Cost Function Video
- Video:** Logistic Regression Cost Function
- Reading:** Clarification about Upcoming Gradient Descent Video
- Video:** Gradient Descent
- Video:** Derivatives
- Video:** More Derivative Examples
- Video:** Computation graph
- Video:** Derivatives with a Computation Graph
- Video:** Logistic Regression Gradient Descent
- Video:** Gradient Descent on m Examples
- Reading:** Derivation of DL/dz (optional reading)
- Reading:** Copy of Clarification about Upcoming Logistic Regression Cost Function Video
- Video:** Vectorization
- Video:** More Vectorization Examples
- Reading:** Clarification of "dz"
- Video:** Vectorizing Logistic Regression
- Video:** Vectorizing Logistic Regression's Gradient Output
- Video:** Broadcasting in Python
- Video:** A note on python/numpy vectors
- Video:** Quick tour of Jupyter/Python Notebooks
- Video:** Explanation of logistic regression cost function (optional)
- Reading:** Deep Learning Honor Code
- Reading:** Programming Assignment FAQ
- Ungraded Lab:** Python Basics with numpy (optional)
- Ungraded Programming Assignment:** Python Basics with numpy (optional)
- Ungraded Lab:** Logistic Regression with a Neural Network mindset
- Video:** Pieter Abbeel interview

[Show less](#)

Graded: Neural Network Basics

Graded: Logistic Regression with a Neural Network mindset

Week 3

Shallow neural networks

Learn to build a neural network with one hidden layer, using forward propagation and backpropagation.

12 videos, 2 readings

- Video:** [Neural Networks Overview](#)
- Video:** Neural Network Representation
- Video:** Computing a Neural Network's Output
- Video:** Vectorizing across multiple examples
- Video:** Explanation for Vectorized Implementation
- Reading:** Clarification: Activation Function
- Video:** Activation functions
- Video:** Why do you need non-linear activation functions?
- Video:** Derivatives of activation functions
- Video:** Gradient descent for Neural Networks
- Reading:** Clarification about Upcoming Backpropagation intuition (optional)
- Video:** Backpropagation intuition (optional)
- Video:** Random Initialization
- Ungraded Lab:** Planar data classification with a hidden layer
- Video:** Ian Goodfellow interview

[Show less](#)

Graded: Shallow Neural Networks

Graded: Planar data classification with a hidden layer

Week 4

Deep Neural Networks

Understand the key computations underlying deep learning, use them to build and train deep neural networks, and apply it to computer vision.

8 videos, 3 readings

- Video:** [Deep L-layer neural network](#)
- Video:** Forward Propagation in a Deep Network
- Reading:** Clarification about Getting your matrix dimensions right video
- Video:** Training your matrix dimensions right
- Video:** Why deep representations?
- Video:** Building blocks of deep neural networks
- Reading:** Clarification about Upcoming Forward and Backward Propagation Video
- Video:** Forward and Backward Propagation
- Video:** Parameters vs Hyperparameters
- Reading:** Clarification about What does this have to do with the brain video
- Video:** What does this have to do with the brain?
- Ungraded Lab:** Building your Deep Neural Network: Step by Step
- Ungraded Lab:** Deep Neural Network - Application

[Show less](#)

Graded: Key concepts on Deep Neural Networks

Graded: Building your deep neural network: Step by Step

Graded: Deep Neural Network Application

[View Less](#)

How It Works

General

How do I pass?

To earn your Certificate, you'll need to earn a passing

[View More](#)

Programming assignments

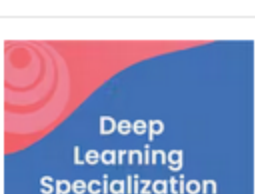
Programming assignments require you to write and run a computer program to solve a problem.

[View More](#)

Course 1 of Specialization

Become a Machine Learning expert

Master the fundamentals of deep learning and break into AI. Recently updated with cutting-edge techniques!



Deep Learning
DeepLearning.AI

[Learn More](#)

[View the course in catalog](#)

Related Courses



Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization

DeepLearning.AI



Structuring Machine Learning Projects

DeepLearning.AI