Neural Networks and Deep Learning

deeplearning.ai

About this course: If you want to break into cutting-edge AI, this course will help you do so. Deep learning engineers are highly sought after, and mastering deep learning will give you numerous new career opportunities. Deep learning is also a new "superpower" that will let you build AI systems that just weren't possible a few years ago.

In this course, you will learn the foundations of deep learning. When you finish this class, you will:
- Understand the major technology trends driving Deep Learning
- Be able to build, train and apply fully connected deep neural networks
- Know how to implement efficient (vectorized) neural networks
- Understand the key parameters in a neural network's architecture

This course also teaches you how Deep Learning actually works, rather than presenting only a cursory or surface-level description. So after completing it, you will be able to apply deep learning to a your own applications. If you are looking for a job in AI, after this course you will also be able to answer basic interview questions.

This is the first course of the Deep Learning Specialization.

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Who is this class for: Prerequisites: Expected: - Programming: Basic Python programming skills, with the capability to work effectively with data structures. Recommended: - Mathematics: Matrix vector operations and notation. - Machine Learning: Understanding how to frame a machine learning problem, including how data is represented will be beneficial. If you have taken my Machine Learning Course here, you have much more than the needed level of knowledge.

Created by: deeplearning.ai

Taught by: Andrew Ng, Co-founder, Coursera; Adjunct Professor, Stanford University; formerly head of Baidu AI Group/Google Brain

Basic Info	Course 1 of 5 in the Deep Learning Specialization
Level	Intermediate
Commitment	4 weeks of study, 3-6 hours a week
Language	English
How To Pass	Pass all graded assignments to complete the course.
User Ratings	★★★★½ 4.9 stars

Course 1 of Specialization

Deep Learning Specialization. Master Deep Learning, and Break into AI

Deep Learning

deeplearning.ai

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, 2 readings

1. **Video:** Welcome
2. **Video:** What is a neural network?
3. **Video:** Supervised Learning with Neural Networks
4. **Video:** Why is Deep Learning taking off?
5. **Video:** About this Course
6. **Reading:** Frequently Asked Questions
7. **Video:** Course Resources
8. **Reading:** How to use Discussion Forums
9. **Video:** Geoffrey Hinton interview

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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, 2 readings

1. **Video:** Binary Classification
2. **Video:** Logistic Regression
3. **Video:** Logistic Regression Cost Function
4. **Video:** Gradient Descent
5. **Video:** Derivatives
6. **Video:** More Derivative Examples
7. **Video:** Computation graph
8. **Video:** Derivatives with a Computation Graph
9. **Video:** Logistic Regression Gradient Descent
10. **Video:** Gradient Descent on m Examples

11. **Video:** Vectorization
12. **Video:** More Vectorization Examples
13. **Video:** Vectorizing Logistic Regression
14. **Video:** Vectorizing Logistic Regression's Gradient Output
15. **Video:** Broadcasting in Python
16. **Video:** A note on python/numpy vectors
17. **Video:** Quick tour of Jupyter/iPython Notebooks
18. **Video:** Explanation of logistic regression cost function (optional)
19. **Reading:** Deep Learning Honor Code
20. **Reading:** Programming Assignment FAQ
21. **Notebook:** Python Basics with numpy (optional)
22. **Ungraded Programming:** Python Basics with numpy (optional)
23. **Notebook:** Logistic Regression with a Neural Network mindset
24. **Video:** Pieter Abbeel interview

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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

1. **Video:** Neural Networks Overview
2. **Video:** Neural Network Representation
3. **Video:** Computing a Neural Network's Output
4. **Video:** Vectorizing across multiple examples
5. **Video:** Explanation for Vectorized Implementation
6. **Video:** Activation functions
7. **Video:** Why do you need non-linear activation functions?
8. **Video:** Derivatives of activation functions
9. **Video:** Gradient descent for Neural Networks
10. **Video:** Backpropagation intuition (optional)
11. **Video:** Random Initialization
12. **Notebook:** Planar data classification with a hidden layer
13. **Video:** Ian Goodfellow interview

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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

1. **Video:** Deep L-layer neural network
2. **Video:** Forward Propagation in a Deep Network
3. **Video:** Getting your matrix dimensions right
4. **Video:** Why deep representations?
5. **Video:** Building blocks of deep neural networks
6. **Video:** Forward and Backward Propagation
7. **Video:** Parameters vs Hyperparameters
8. **Video:** What does this have to do with the brain?
9. **Notebook:** Building your Deep Neural Network: Step by Step
10. **Notebook:** Deep Neural Network - Application

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Graded: Key concepts on Deep Neural Networks

Graded: Building your deep neural network: Step by Step

Graded: Deep Neural Network Application

View Less

FAQs

When will I have access to the lectures and assignments?

Once you enroll for a Certificate, you'll have access to all videos, quizzes, and programming assignments (if applicable). Peer review assignments can only be submitted and reviewed once your session has begun. If you choose to explore the course without purchasing, you may not be able to access certain assignments.

What will I get if I pay for this course?

If you pay for this course, you will have access to all of the features and content you need to earn a Course Certificate. If you complete the course successfully, your electronic Certificate will be added to your Accomplishments page - from there, you can print your Certificate or add it to your LinkedIn profile. Note that the Course Certificate does not represent official academic credit from the partner institution offering the course.

Can I take this course for free?

This course is offered with a 7-day full access free trial that lets you see everything a paid subscription includes for free for 7 days. You can cancel it at any time. You can also audit video lectures and certain assignments for free without subscribing or starting a free trial. If you want to complete the course and earn a Course Certificate by submitting assignments for a grade, you can upgrade your experience by subscribing to the course. You can also apply for financial aid if you can't afford the course fee.

What is the refund policy?

You will be eligible for a full refund until two weeks after your payment date, or (for courses that have just launched) until two weeks after the first session of the course begins, whichever is later. You cannot receive a refund once you've earned a Course Certificate, even if you complete the course within the two-week refund period. View our full refund policy.

Is financial aid available?