

NVIDIA: Fundamentals of Deep Learning (Coursera)

Course : Deep Learning

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B.E. Third Year Batch - 3C54

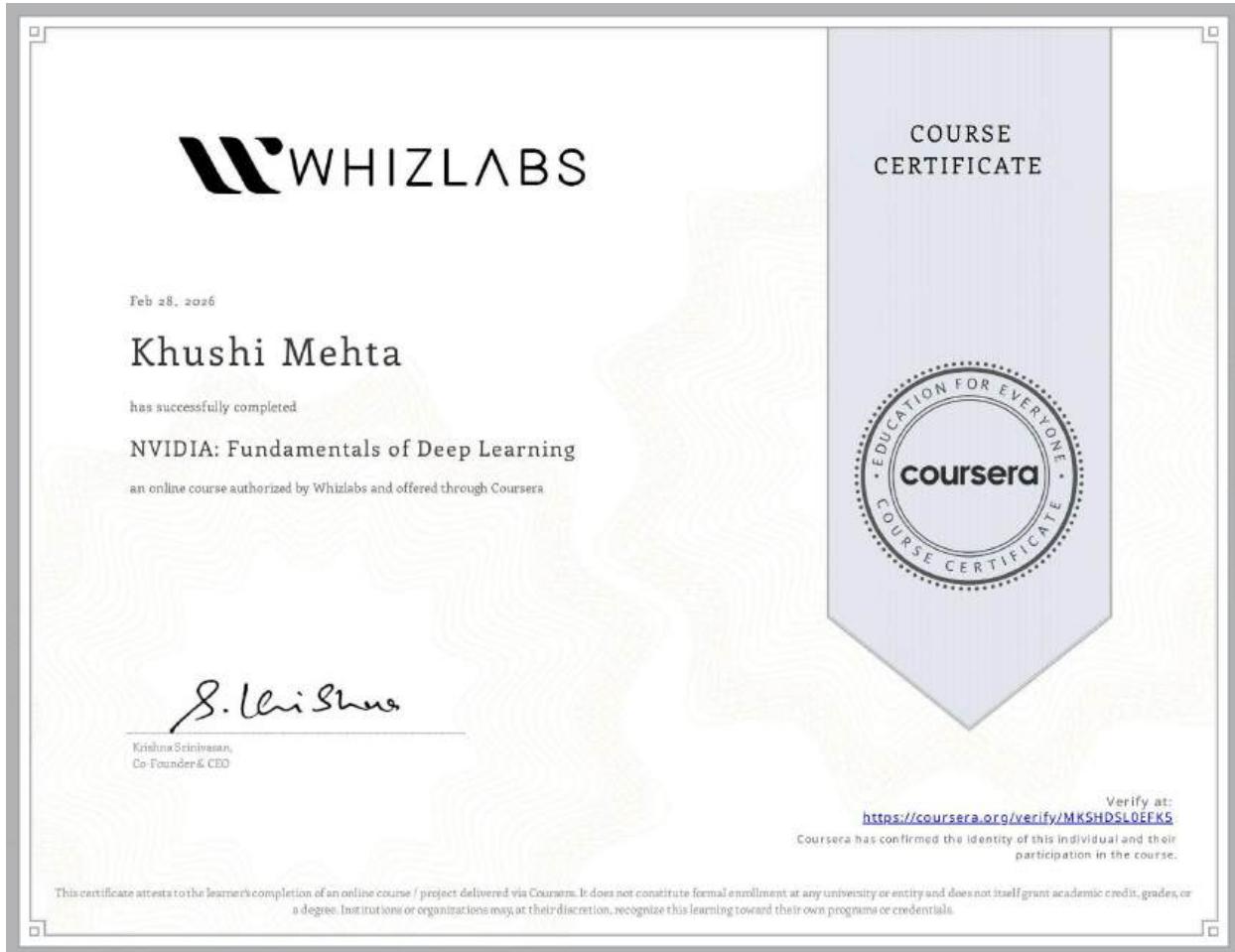
Submitted to: Sukhpal Singh



THAPAR INSTITUTE
OF ENGINEERING & TECHNOLOGY
(Deemed to be University)

Computer Science and Engineering Department
Thapar Institute of Engineering and Technology
Jan - June 2026

Certificate of completion



Module 1

Fundamentals of Deep Learning

Practice Assignment

The screenshot shows a browser window with several tabs open. The main content is the 'Introduction to Deep Learning & Neural Networks - Knowledge check' assignment page on the Coursera platform. On the left, there's a sidebar with a tree view of course content under 'NVIDIA: Fundamentals of Deep Learning'. The assignment details show a grade of 100% and submission information from Feb 20, 3:12 PM (EST). Below the assignment details, there are buttons for 'View submission' and 'See feedback'. At the bottom right of the assignment area, there's a 'Go to next item' button.

This screenshot shows the same assignment page but focuses on individual questions. Question 1 asks about the Input Layer, with the correct answer being 'Input Layer'. A green box highlights the correct answer and provides a detailed explanation: 'Correct. The Input Layer is the first layer in a DNN and is designed to take in the raw, unprocessed data. For more information, refer to the video "What is Deep Learning?".' Question 2 asks about the best type of Deep Neural Network for processing images and videos, with the correct answer being 'Convolutional Neural Network (CNN)'. A green box highlights the correct answer and provides a detailed explanation: 'Correct. Convolutional Neural Networks (CNNs) are specifically designed to handle image and video data due to their ability to capture spatial patterns. For more information, refer to the video on "What is Deep Learning?".'

The screenshot shows a browser window with the URL coursera.org/learn/fundamentals-of-deep-learning/assignment-submission/AZ4t1/introduction-to-deep-learning-neural-networks-knowledge-check/view-feedback. The page displays a knowledge check for the "Introduction to Deep Learning & Neural Networks" course.

Question 1: What role do Weights play in an artificial neuron?

- Introduce non-linearity
- Determine the importance of each input
- Provide a constant offset
- Receive the initial data

Feedback: Correct. Weights are associated with each input and control how much influence each input has on the neuron's output. For more information, refer to the video on "Deep Dive into Neurons".

Score: 1/1 point

Question 4: What is the first step in the computation process of an artificial neuron?

- Apply the activation function
- Calculate the weighted sum
- Transmit the output signal
- Adjust the bias

Feedback: Correct. The first step is to calculate the weighted sum of the inputs, which involves multiplying each input by its corresponding weight and adding the bias. For more information, refer to the video on "Deep Dive into Neurons".

Score: 1/1 point

Question 5: What is the initial step in the Gradient Descent algorithm?

- Calculate the gradient of the loss function
- Update the model parameters
- Initialize the model parameters with random values
- Repeat steps until convergence

Feedback: This is correct. The first step is to assign random values to the model's parameters, serving as the starting point for optimization. For more information, refer to the video "Gradient Descent".

Score: 1/1 point

Graded Assignment

The screenshot shows a browser window with the URL coursera.org/learn/fundamentals-of-deep-learning/assignment-submission/XfXfX/foundations-of-deep-learning-assessment. The page displays a graded assignment for the "Foundations of Deep Learning" course.

Assignment Details:

- Title:** Foundations of Deep Learning - Assessment
- Due:** May 4, 11:59 PM (ET) - 1 left (Submissions every 6 hours)
- Submitted:** Feb 26, 4:27 PM (ET)
- Grade:** 100%

Review Learning Objectives:

coach
Ready to review what you've learned before starting the assignment? I'm here to help.

Assignment details:

Your grade
To pass you need at least 50%. We keep your highest score.

Actions:

- View submission
- See feedback
- Like
- Discuss
- Report as issue
- Go to next item

Your grade: 100%

1. What is the mathematical formula for the ReLU activation function?

A. $f(x) = \max(0, x)$

B. $f(x) = (1 + e^{-x})^{-1}$

C. $f(x) = \sin(x)$

D. $f(x) = x$

Correct This is correct. The ReLU function outputs the input directly if it's positive, otherwise it outputs zero. For more information, refer to the video "Understanding Activation Functions".

2. What is the purpose of applying an activation function in a layer?

A. To normalize the input values.

B. To introduce non-linearity into the model.

C. To calculate the weighted sum of inputs.

D. To produce the final prediction.

Correct Activation functions introduce non-linearity, allowing the network to learn complex patterns in the data. For more information, refer to the video "Deep Learning Neural Network - Non-linear Propagation".

3. If the equation $a = W \cdot x + b$ is what does a represent?

A. The weight matrix.

B. The output matrix.

C. The bias vector.

D. The sum of weighted sum for all neurons in a layer.

Correct This is correct. The result of the matrix multiplication between the weight matrix (W) and the input matrix (x) is also the bias vector (b). Finally the weight matrix (W) has to be multiplied by the activation function (f) before the activation function is applied. For more information, refer to the video "Deep Learning Neural Network - Non-linear Propagation".

4. What is the primary goal of backpropagation in neural networks?

A. To initialize the model's parameters.

Correct This is correct. The result of the matrix multiplication between the weight matrix (W) and the input matrix (x) is also the bias vector (b). Finally the weight matrix (W) has to be multiplied by the activation function (f) before the activation function is applied. For more information, refer to the video "Deep Learning Neural Network - Non-linear Propagation".

5. What is the primary goal of backpropagation in neural networks?

A. To validate the model's parameters.

B. To make predictions on new data.

C. To minimize the model's error and improve model accuracy.

D. To introduce non-linearity into the model.

Correct This is correct. Backpropagation's primary purpose is to iteratively adjust the network's weights and biases to reduce the error between its predictions and the true values. thereby minimizing the model's error. For more information, refer to the video "Backpropagation - Deep Learning Neural Network".

6. Which step involves feeding the input data through the network to generate a prediction?

A. Forward Pass

B. Loss Function

C. Backward Pass

D. Weight Initialization

Correct This is correct. The forward pass is where the input data flows through the network, layer by layer, resulting in the final output or prediction. For more information, refer to the video "Backpropagation - Deep Learning Neural Network".

7. Given a categorical feature with values 'red', 'green', 'blue', what would be the one-hot encoded representation of 'green'?

A. [0, 0, 0]

B. [1, 0, 0]

C. [0, 0, 1]

D. [1, 1, 0]

Correct This is correct. In one-hot encoding, each category gets its own binary digits. 'Green' is the second category, so it's represented by [0, 1, 0]. For more information, refer to the video "Deep Learning - Handling Multi-class Classification".

Module 2

Advanced Deep Learning Techniques

Practice Assignment

The screenshot shows a browser window with the Coursera logo at the top. The main content area displays the title "Deep Learning & Transfer Learning Techniques - Knowledge check". Below the title, there's a section titled "Review Learning Objectives" and "Assignment details". The assignment was submitted on Feb 26, 7:42 PM (ET) and has 1 attempt. A large green box indicates a grade of 100%. At the bottom, there are buttons for "View submission", "See feedback", and "Report as issue". On the left side of the screen, there's a sidebar with a navigation menu for the course "NVIDIA: Fundamentals of Deep Learning".

The screenshot shows a browser window with the Coursera logo at the top. The main content area displays the title "Your grade: 100%" and a message: "Your latest: 100% • Your highest: 100% • To pass you need at least 50%. We keep your highest score." Below this, there are two questions with their respective feedback. Question 1 asks: "What type of data are Convolutional Neural Networks (CNNs) primarily designed to process?". The correct answer is "Grid-like data, such as images and video". Question 2 asks: "What is the primary purpose of Pooling Layers in a CNN?". The correct answer is "To reduce the spatial dimensions of the data by downsampling". Both questions have a "Next item" button at the end.

1 / 1 point

3. What is the core concept behind transfer learning?

- Training a model from scratch on a small dataset.
- Leveraging knowledge from a pre-trained model on a new but related task.
- Creating a completely new neural network architecture for every task.
- Only using labeled data for training.

Correct
This is Correct. Transfer learning involves taking a model that has been trained on a large dataset and adapting it to a new, but related, task. For more information, refer to the video "Transfer Learning Techniques".

1 / 1 point

4. In which scenario is transfer learning most likely to be beneficial?

- You have abundant labeled data for your specific task.
- The pre-trained model was trained on a task completely unrelated to your target task.
- You have ample computational resources and a large dataset for your new task.
- You have a small dataset for your specific task and limited computational resources.

Correct
This is Correct. Transfer learning is particularly advantageous when you have a small dataset and limited computational power, as it allows you to leverage the knowledge from a pre-trained model. For more information, refer to the video "Transfer Learning Techniques".

Graded Assignment

Set up a learning plan

NVIDIA: Fundamentals of Deep Learning

Foundations of Deep Learning - Assessment
Graded Assignment • Grade: 100%

Module 2
Advanced Deep Learning Techniques

- Overview of Advanced Deep Learning
- Techniques
Reading • 13 min
- Multi Class Classification with MNIST Dataset
- Deep Learning
Video • 33 min
- Training Multiclass Classifier - Part 1 and Evaluation
Video • 7 min
- Understanding the Convolutional Neural Networks
Video • 3 min
- Transfer Learning Techniques
Video • 8 min
- Implementing the Transfer Learning on an Image Dataset - Demo
Video • 9 min
- Deep Learning & Transfer Learning
Techniques - Knowledge check
Practice Assignment • Grade: 100%
- Advanced Deep Learning Techniques Assessment
Graded Assignment • Grade: 100%
- Key Takeaways of the course
Reading • 13 min
- Course Conclusion
Reading • 13 min

Advanced Deep Learning Techniques - Assessment

Review Learning Objectives

coach

Ready to review what you've learned before starting the assignment? I'm here to help.

Help me practice Let's chat

Assignment details

Date: Mar 11, 11:00 PM (ET) Attempts: 4 left (3 attempts every 6 hours)

Submitted: Feb 26, 7:43 PM (ET)

80%
To pass you need at least 40%. We keep your highest score.

View submission See feedback

Like Dislike Report as issue

Go to next item →

1 / 1 point

3. Which activation function maps the input to a range between 0 and 1 and is historically popular but suffers from vanishing gradients?

Sigmoid
 Hyperbolic Tangent (tanh)
 Rectified Linear Unit (ReLU)
 Linear

Correct
This is Correct. The sigmoid function has an S-shaped curve that outputs values between 0 and 1. It was widely used in early neural networks, but its gradients tend to become very small as the input values move away from zero, hindering learning in deep networks. For more information, refer to the video "Activation Functions".

1 / 1 point

4. Which activation function is similar to sigmoid but maps the input to a range between -1 and 1?

A-Sigmoid
 Hyperbolic Tangent (tanh)
 Rectified Linear Unit (ReLU)
 Linear

Correct
This is Correct. The tanh function is similar in shape to the sigmoid but its output range is between -1 and 1. This centering often leads to faster convergence during training compared to sigmoid. For more information, refer to the video "Activation Functions - Demo".

1 / 1 point

Your grade: 80%

Your latest: 80% • Your highest: 80% • To pass you need at least 40%. We keep your highest score.

Next item →

1 / 1 point

1. When loading the VGG16 model, what does setting include_top=False signify?

It excludes the final fully connected classification layers of the model
 It excludes the convolutional base of the model
 It loads the model without pre-trained weights.
 It disables transfer learning.

Correct
This is Correct. include_top=False removes the original classification layers, allowing you to add your own custom layers for the new task. For more information, refer to the video "Transfer Learning - Demo".

1 point

2. What is the purpose of freezing layers in the VGG16 model during transfer learning?

To prevent the pre-trained weights from being updated during training
 To slightly speed up the training process
 To reuse the model layers only from the new data
 To reduce the model's complexity

Incorrect
This is Incorrect. The model still leverages the knowledge from the pre-trained layers, even if they are frozen. For more information, refer to the video "Transfer Learning - Demo".

1 / 1 point

c Data Science Elective Basket 20 coursera.org/learn/fundamentals-of-deep-learning/assignment-submission/MrDQ/advanced-deep-learning-techniques-assessment/view-feedback

Advanced Deep Learning Techniques - Assessment
Grade: Assignment 13.0%

values move away from zero, hindering learning in deep networks. For more information, refer to the video "Activation Functions".

Due: Mar 8, 11:59 PM IST

1 / 1 point

4. Which activation function is similar to sigmoid but maps the input to a range between -1 and 1?

A: Sigmoid
 B: Hyperbolic Tangent (tanh)
 C: Rectified Linear Unit (ReLU)
 D: Linear

Correct:
This is Correct. The tanh function is similar in shape to the sigmoid but its output range is between -1 and 1. This centering often leads to faster convergence during training compared to sigmoid. For more information, refer to the video "Activation Functions - Demo".

1 / 1 point

5. Which of the following is a common approach in transfer learning?

A: Training a model from scratch with random weights
 B: Completely discarding pre-trained models in every training iteration
 C: Avoiding the use of neural networks
 D: Using a pre-trained model as a feature extractor and fine-tuning only specific layers

Correct:
Correct. This is a common approach in transfer learning where the lower layers of a pre-trained model are retained, and only the higher layers are fine-tuned for a specific task. For more information, refer to the video on "Transfer Learning Techniques".