DEEP LEARNING

NANODEGREE FOUNDATION PROGRAM

Student Handbook

Artificial Intelligence is transforming our world in dramatic and beneficial ways with Deep Learning powering that progress. Together with experts in the deep learning field, Udacity provides a dynamic introduction to this amazing field using weekly videos, exclusive projects, and expert feedback to teach you the foundations of this future-shaping technology. To prepare you for this program, we've compiled everything you need to know in this handbook.

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MEET THE TEAM

Meet the Team

YOUR TEAM

Featured Instructors - Sebastian Thrun, Ian Goodfellow, Andrew Trask, Siraj Raval

Instructors - Mat Leonard, Luis Serrano, Alexis Cook, Ortal Arel, Arpan Chakraborty, Jay Alammar

Lead - Mat Leonard

Video - Trish McCallister, Ernesto Melero

Experience Lead - Luke Rucks

Experience Coordinator - Carissa Cullum

Community Manager - Afshan Qureshi

YOUR RESOURCES

Forums

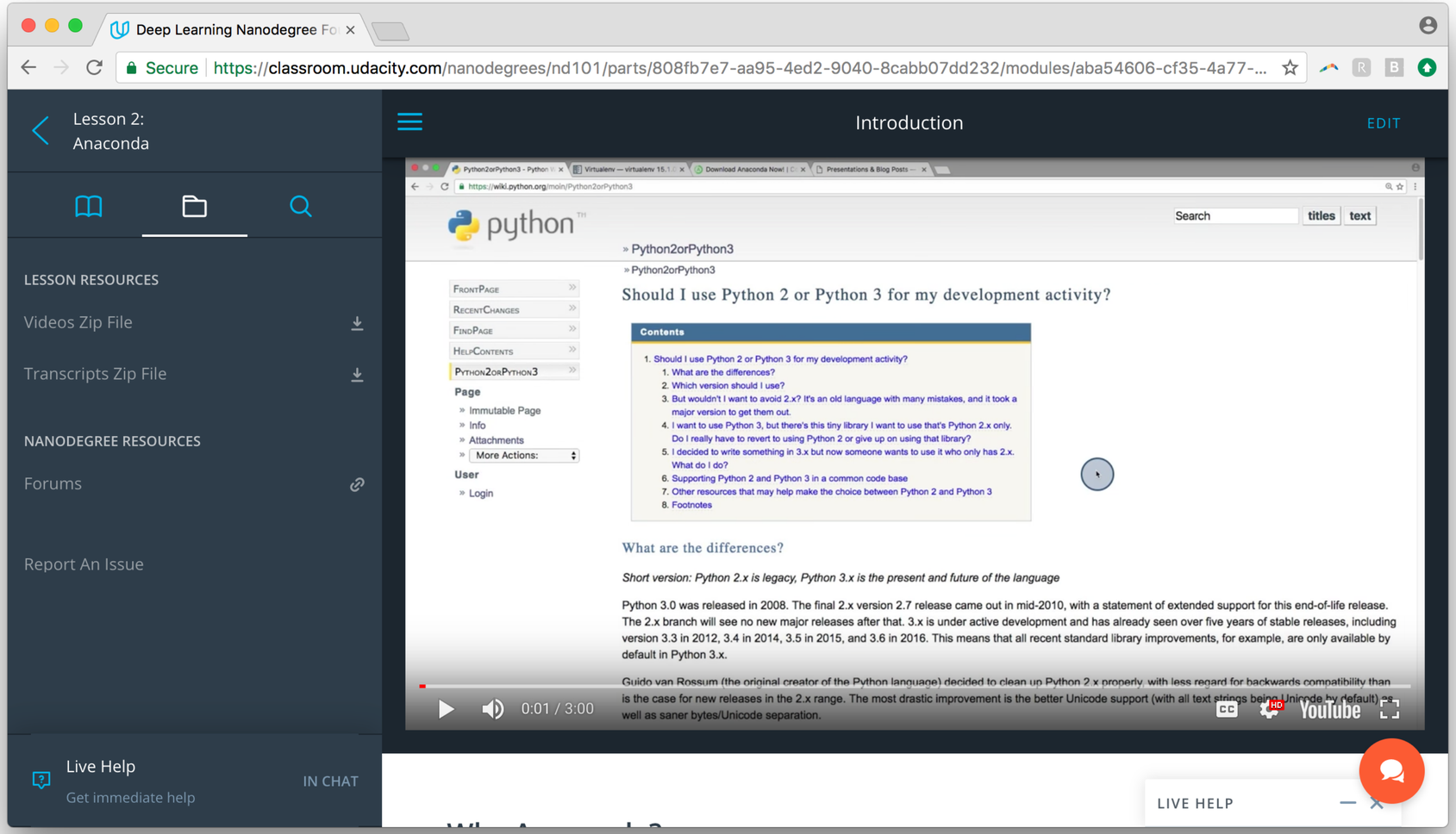
In this Nanodegree Foundation program, you'll have access to an exclusive forum. In this forum, you'll not only be able to talk to other passionate students, but also receive help from our expert coaches and dedicated staff.

We monitor and respond to an ongoing stream of detailed feedback from student forum participants, and this has allowed us the opportunity to constantly refine, enhance, and upgrade the model. Thanks to your feedback in the forums, we can ensure the program improves over time.

Find Forums in the Classroom

1. Open lesson > Resources folder

2. Click on the Forums link



Slack Community

Udacity students of this program can interact with each other live via Slack. Connect directly with students who are online the same time as you: ask questions, exchange ideas, and get to know your fellow classmates.

Join the Slack Team for Deep Learning Nanodegree Foundation students. Once you're in, click on Channels, and introduce yourself on the **#introductions** channel! Make sure to check out the project channels (ex: #project-1) and lesson channels (ex: #l-intro-to-neural-net) to discuss classroom topics with other students.

Support

Please reach out anytime! Udacity has dedicated support for the Deep Learning Nanodegree Foundation program.

Simply reach out on the forums or at **deeplearning-support@udacity.com**.

WHAT TO EXPECT

See our full **Deep Learning Nanodegree Foundation FAQ** and **general Udacity FAQ**.

Class Timeline **Curriculum**

INTRODUCTION

Get introduced to the program and explore various ways deep learning networks are applied. Also, you'll get up to speed on the tools and math you'll be using in the program with some introductory lessons.

NEURAL NETWORKS

Learn the basics of neural networks and build your first neural network with Python and Numpy. You'll also get an introduction to Keras and TensorFlow and how to use them to build neural networks to analyze real data.

Project 1: Your first neural network

CONVOLUTIONAL NEURAL NETWORKS

A few years ago, convolutional networks changed the computer vision field by enabling powerful feature detection in images. In this lesson, you'll learn how to build convolutional networks and use them to classify images based on the objects that appear in them.

Project 2: Dog Breed Classifier

RECURRENT NEURAL NETWORKS

Recurrent neural networks are able to learn information about sequences in data, such as the order of words in text. Recurrent networks also work great as feature extractors for text which you can use for things like sentiment analysis. You'll use recurrent networks to generate new text and translate from one language to another.

Project 3: Generate TV scripts

GENERATIVE ADVERSARIAL NETWORKS

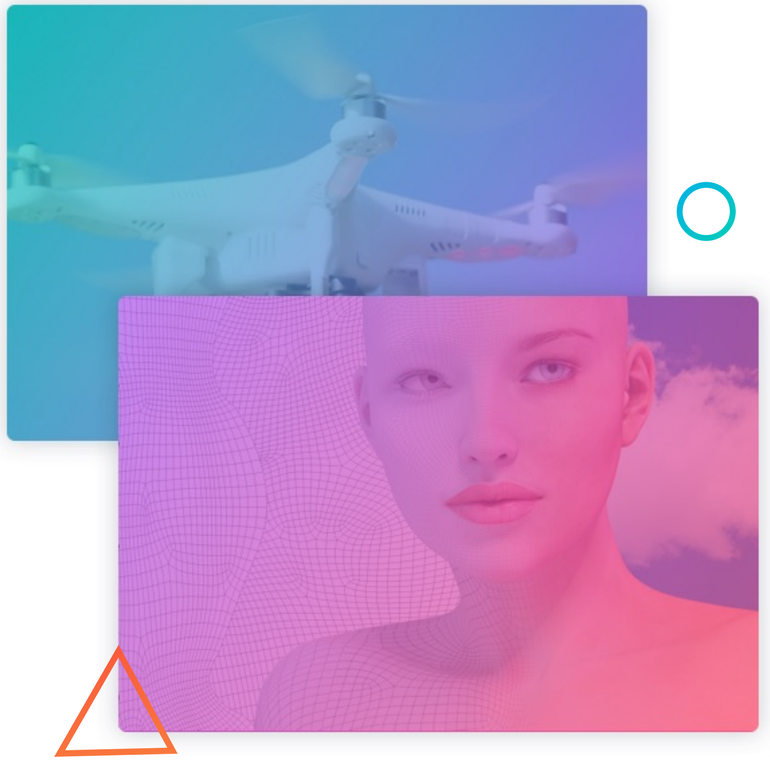
Generative adversarial networks (GANS) pit two neural networks in competition, allowing these networks to model reality with amazing accuracy. Ian Goodfellow, the inventor of GANs, will show you how these fascinating models work and how to build them.

Project 4: Generate Faces

DEEP REINFORCEMENT LEARNING

Use deep neural networks to design agents that can learn to take actions in a simulated environment. Apply reinforcement learning to complex control tasks like video games and robotics.

Project 5: Teach a Quadcopter to Fly



Experts In Residence

Benefit from the opportunity to connect directly with our Udacity Experts-in-Residence, an elite group of deep learning practitioners working at some of the most innovative organizations in the world including OpenAI, GoogleBrain, DeepMind, and more. In moderated office hour sessions, you'll get actionable insights and guidance that will power your progress through the program, and help prepare you for the next steps in your deep learning future.

System Requirements

The minimum system requirement is a 64-bit operating system with ~8 GB of RAM. You will also need to install Python 3 and Jupyter Notebooks.

Later in the program, we will provide you with the AWS instance for more intensive needs.

Class Timeline | **Deadlines**

Our ultimate goal is to ensure that every single student accepted into the program successfully graduates. Our coaches and Mentors will work directly with any students who are struggling with the timeline requirements.

Deadline for graduation: In order to graduate the program, you must complete, submit and meet expectations for all required projects within 4 months of your start date. Meeting expectations means a Udacity Reviewer has marked your project as “Meets Specifications.”

Individual project deadlines: While individual project deadlines are suggested, they are critical to your success and to reaching graduation. We strongly urge students to keep good standing with regards to individual project deadlines.

Class Timeline | **Missing Deadlines**

If you do not complete the term by the term deadline, you will receive a free four-week extension, which will be automatically applied to your account. If you do not complete the term within the extension period, you do not graduate and earn your credential, and you are no longer eligible to receive automatic admission into the Robotics, Artificial Intelligence or Self-Driving Car Nanodegree programs. To resume access to the course, you would need to re-enroll in a new term and pay the associated enrollment fees again. Your progress will carry over to the new term.

If you miss individual project deadlines, you jeopardize your ability to meet the 4-month term completion requirement, which in turn jeopardizes your ability to graduate and receive your credential along with your guaranteed admission into the Robotics, Artificial Intelligence or Self-Driving Car Nanodegree programs. Maintaining good standing with regards to project deadlines is critical to your success.

Class Timeline | **Time Dedication**

8-12 HOURS / WEEK

Between instructional content, projects, and other course-related activity, we estimate that investing 8-12 hours/week will enable you to proceed through the program at a successful pace.

Class Timeline | **Schedule**

Find the dates for each of your project deadlines next to the respective lesson in your classroom.

- **Project 1** Your First Neural Network
- **Project 2** Dog Breed Classifier
- **Project 3** Generate TV Scripts
- **Project 4** Generate Faces
- **Project 5** Teach a Quadrocopter to Fly

Professional Profile

If you are enrolled to one of our career-ready Nanodegree programs, you will be able to access your professional profile from the classroom.

Even though the Deep Learning Nanodegree Foundation program is not a career-ready program, you can still add it to your profile. You just need to create a custom card under the Education category of your profile. You will not be able to highlight it on your profile as this is only possible for career-ready programs.

The same goes for Projects. Projects are only eligible to be automatically added into your Profile from career-ready Nanodegrees, but you may manually add projects from this program by creating a custom Project card.

What to Expect After Graduation

NANODEGREE CREDENTIAL

Students who graduate the program receive a Udacity credential in Deep Learning Foundations.

CONTINUED LEARNING

Your deep learning practice doesn't end with graduation. In fact, it's just beginning — graduation from this program will guarantee entrance to our Artificial Intelligence, Self-Driving Car, or Robotics Nanodegree programs.

All three of these world-changing programs have a competitive pool of applicants vying for admission, as well as industry names like Mercedes-Benz and IBM Watson seeking to hire future engineers like you. These programs will equip you with additional 1:1 mentorship and career support to get you on your path to becoming an engineer in the field. Read more on the Artificial Intelligence, Self-Driving Car, and Robotics Nanodegree curriculums.

What to Expect After Graduation

ENROLLING IN AN ADVANCED NANODEGREE

To enroll in one of the three advanced Nanodegree programs, you will receive an email with a link to our enrollment page shortly after the end-of-term deadline (at the end of the program's four month duration). If you happen to graduate early, you might receive this email earlier than the end-of-term deadline.

Because you have guaranteed entry to the three programs upon graduation, you will NOT need to apply to the Nanodegree program of your choice via the application process. You may forgo the application process, and instead enroll directly via the enrollment page that we will email to you.

Policy

COST

This Nanodegree Foundation program costs $599.

REFUND

Students have a 7-day window from the day they receive access to the program, the first day of their class, to un-enroll and request a refund. To request a refund, email **deeplearning-support@udacity.com**. Please review Deep Learning Nanodegree Foundations FAQ for more information.

FURTHER READING

Courses on Udacity

Machine Learning Engineer Nanodegree by Google (Currently Available)

Artificial Intelligence for Robots (Free Course)

Intro to Statistics (Free Course)

Deep Learning (Free Course)

Programming Foundations with Python (Free Course)

Intro to Computer Vision (Free Course)

Intro to Data Analysis (Free Course)

Intro to Computer Science (Free Course)

Linear Algebra Refresher Course (Free Course)

Intro to Programming Nanodegree

Recommended Books

Grokking Deep Learning by Andrew Trask. Use our exclusive discount code traskud17 for 40% off. This provides a very gentle introduction to Deep Learning and covers the intuition more than the theory.

Neural Networks And Deep Learning by Michael Neilsen. This book is more rigorous than Grokking Deep Learning and includes a lot of fun, interactive visualizations to play with.

The Deep Learning Book from Ian Goodfellow, Yoshua Bengio, and Aaron Courville. This online book has lot of material and is the most rigorous of the three books suggested.

Reading Resources

Deep Learning Nanodegree Foundation Program Syllabus, In Depth (Dhruv Parthasarathy)

Transmission.ai - Self Driving Car & Deep Learning Newsletter (Oliver Cameron)

Machine Learning is Fun! An introduction to Machine Learning (Medium)

Are Udacity Nanodegrees worth it for finding a job? (Quora)

Understanding LSTM Networks (Christopher Ola)

A Beginner's Guide To Understanding Convolutional Neural Networks (Adit Deshpande)

6 areas of AI and machine learning to watch closely (Medium)

Most Cited Deep Learning Papers (Github)

In-Depth on Udacity's Self-Driving Car Curriculum (David Silver)

AI Nanodegree Program Syllabus: Term 1, In Depth (Dhruv Parthasarathy)

News / Resources

What a Deep Neural Network thinks about your #selfie (Andrej Karpathy)

Neuron explained using simple algebra (Medium)

26-year-old hacker gets $3M for self-driving car startup (CNN)

Identifying rare diseas, lung cancer and more with Deep Learning (Transmission)

3D Faces Generated From 2D Photos, Machines Learning to Hand-Write & More (Transmission)

App Helps Fishermen Instantly ID Their Catch (NVIDIA)

The Unreasonable Effectiveness of Recurrent Neural Networks (Andrej Karpathy)

Write an AI to win at Pong from scratch with Reinforcement Learning (Medium)

Datasets

Kaggle

Reddit

Aggregate of Datasets

Other Resources

Tensorflow Playground

Pytorch

Deep Learning Framework written in Swift to use on apple devices (written by @amund)

MIT 18.06 Introduction to Linear Algebra

Andrej Karpathy CS231n Convolutional Neural Networks for Visual Recognition

Andrew Ng’s Machine Learning class

SEE YOU IN CLASS!