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# SIRAJ RAVAL'S DEEP LEARNING

NANODEGREE FOUNDATION PROGRAM

Student Handbook

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Artificial Intelligence is transforming our world in dramatic and beneficial ways, and Deep Learning is powering the progress. Together with Siraj Raval, Udacity provides a dynamic introduction to this amazing field, using weekly videos, exclusive projects, and expert feedback and review 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

## MEET SIRAJ

Hello, I'm Siraj! I'm a Data Scientist, bestselling author, and YouTube star. I make videos that teach people how to use machine learning to create game bots, chatbots, self driving cars, programs that create art & music, stock prediction models, and much more. I'm proud to be an exclusive Udacity partner, and excited to be your host for this amazing program.

## YOUR TEAM

**Instructors** - Siraj Raval, Mat Leonard, Ian Goodfellow, Andrew Trask, Brok Bucholtz

**Services Lead** - Luke Rucks

**Leads** - Orit Avital, Niko Cunningham

**Video** - Trish McCallister, Ernesto Melero

**Student Support Coordinator** - Jessica Park

**Community** - Lisbeth Ortega





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# YOUR RESOURCES



# Forums

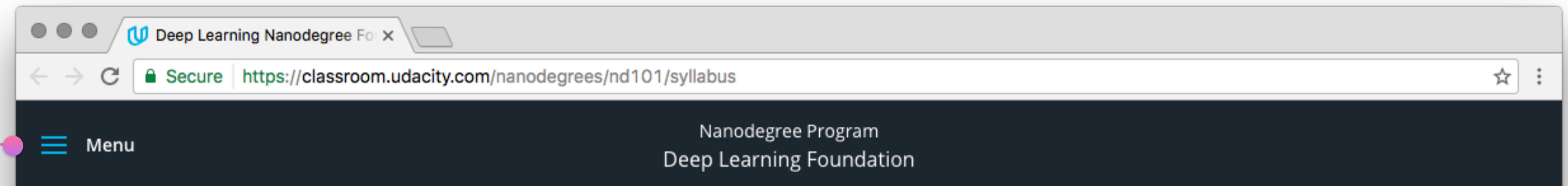
In this Nanodegree Foundation program, you'll have access to an exclusive forum. In this forum you'll not only be able to talk to other passionate students, but also receive help from our expert Coaches and dedicated staff.

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.

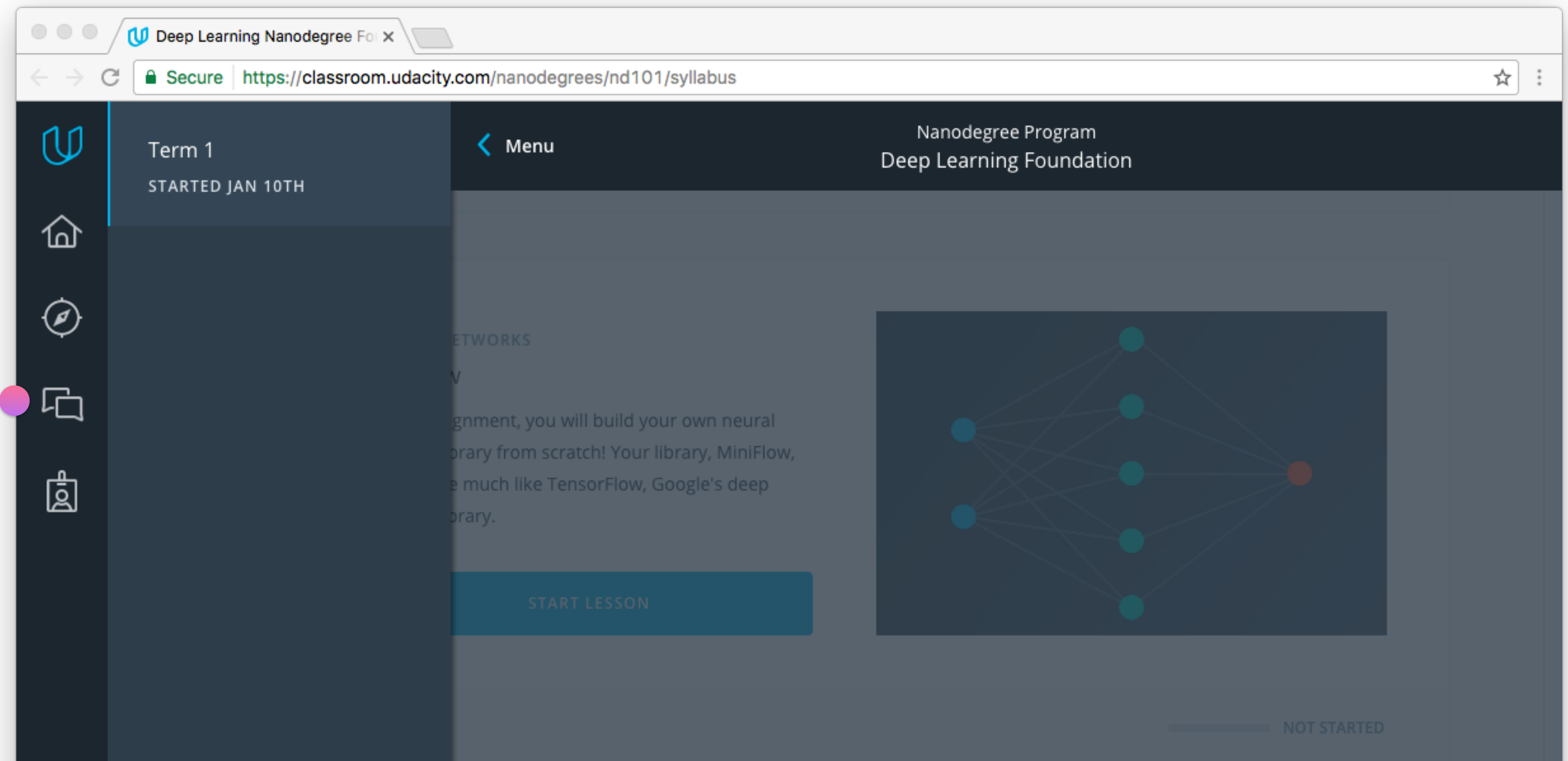


# Find Forums in the Classroom

1. Open the menu



2. Click on the forums icon



# Slack

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

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](mailto:deeplearning-support@udacity.com)**.

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# WHAT TO EXPECT

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



# 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 Pacing

This is a unique, 17 week-long program that will bring students new lessons every few weeks. Students are expected to keep pace with their peers throughout the duration of the program and will complete 5 Deep Learning projects by their respective project deadlines. The entire program takes 4 months to complete.

## Weekly Pace

Every few weeks, we will release new content that will include Siraj's introductory video and content from Udacity. Every Wednesday, we will release a pre-recorded code walkthrough session with Siraj.

# 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 TensorFlow and how to use it to build deep neural networks.

### 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: Image Classification



## 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.

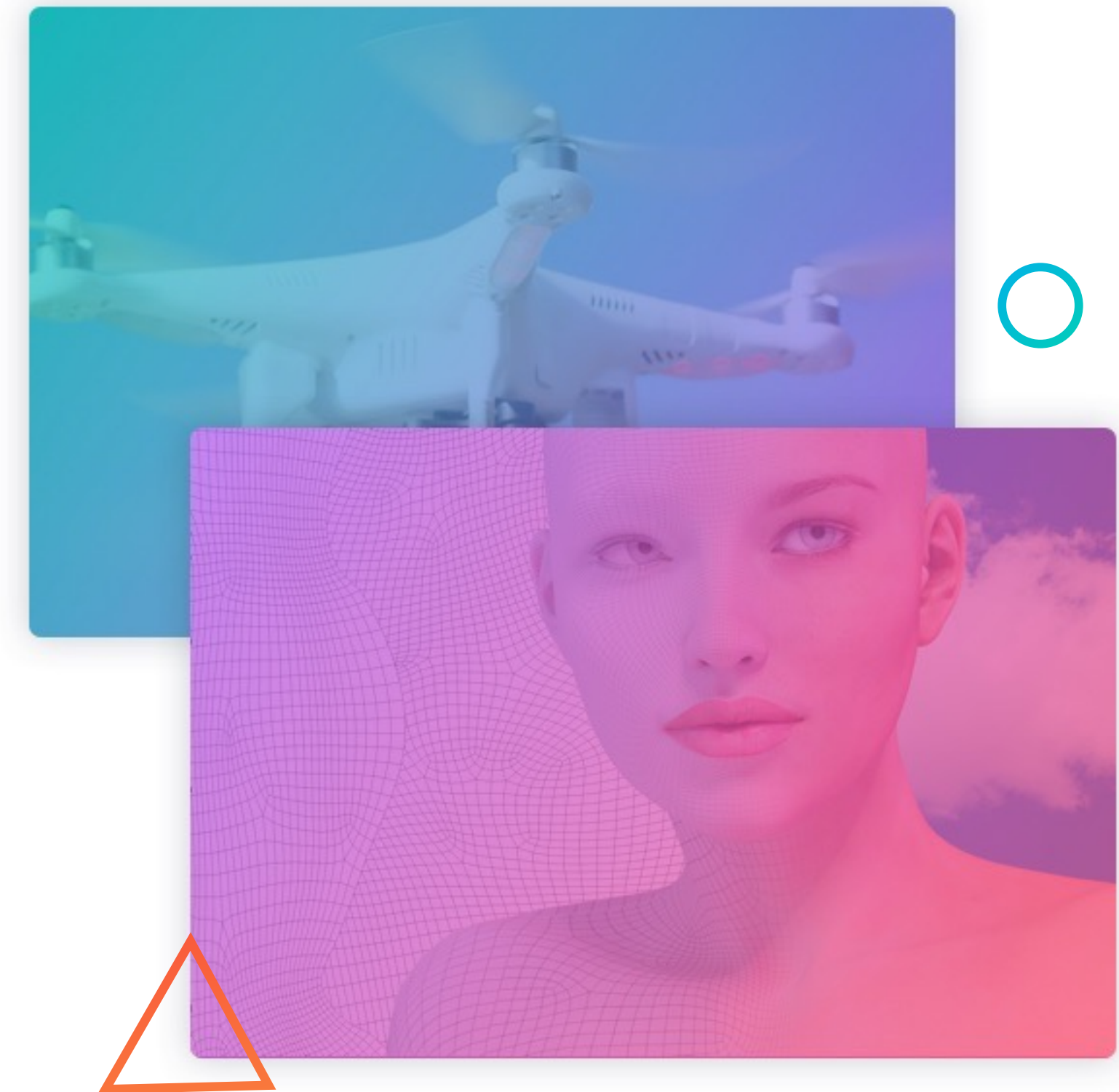
**Project 3: Generate TV scripts**

**Project 4: Translate a Language**

## 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 5: GAN**





# 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 6 months of your start date. Meeting expectations means a Udacity Reviewer has marked your project as “Meets Specifications.”

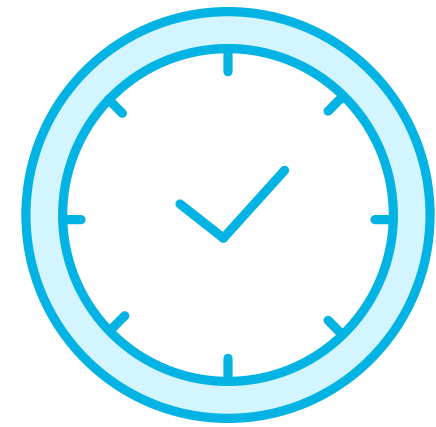
**Individual project deadlines:** While individual project deadlines are suggested, they are critical to your success and to reaching graduation. We strongly urge students to keep good standing with regards to individual project deadlines.

# Class Timeline **Missing Deadlines**

**If you do not complete all projects within 6 months of the start of the program**, 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. You will be removed from the program and will need to re-enroll—your progress does not carry over, and you will need to start from the beginning again.

**If you miss individual project deadlines**, you jeopardize your ability to meet the 6-month requirement, graduate, receive your credential and 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. If you're not keeping pace with your fellow students, forums and Slack channels can lose their value. Your peer network can break down, because you're no longer working on the same content as the rest of your class. Plus, you miss out on exclusive content rewards for on-time submissions!

# 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**    Image Classification
- **Project 3**    Generate TV Scripts
- **Project 4**    Translate a Language
- **Project 5**    Generate Faces



# Community

Finding support in fellow students can make all the difference in your educational experience. Take advantage of Slack and the Udacity forums. These are spaces to exchange ideas, questions and progress with your classmates.

## COMMUNITY EVENTS

Community events will give you the opportunity to meet classmates both on and offline (dependent on location), team-build and take part in extracurricular opportunities.

# 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.

Graduates will also receive \$100 off of the first term of their chosen of the above Nanodegrees. The \$100 credit is only applicable to students who enroll in Artificial Intelligence, Self-Driving Car, or Robotics Nanodegree upon successful completion of Deep Learning Nanodegree Foundation program.

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.

# 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 view [Deep Learning Nanodegree Foundations FAQ](#) for more information.

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## 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)

[Introduction to Computer Vision](#)

# 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 diseases, 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](#)

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SEE YOU IN CLASS!