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# SIRAJ RAVAL'S DEEP LEARNING FOUNDATIONS

NANODEGREE FOUNDATIONS 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

**Services Lead** - Adarsh Nair

**Leads** - Orit Avital, Mike Wales, Dhruv Parthasarathay

**Community** - Lisbeth Ortega

**Mentors** - Dozens you'll meet along the way!





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# YOUR RESOURCES



# Forums

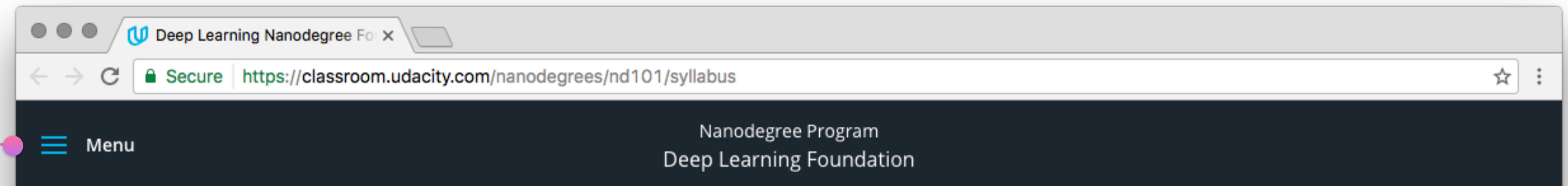
In this Nanodegree Foundations program, you'll have access to an exclusive forum. In this forum you'll not only be able to talk to other passionate students, but also receive help from our expert Coaches and dedicated staff.

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.

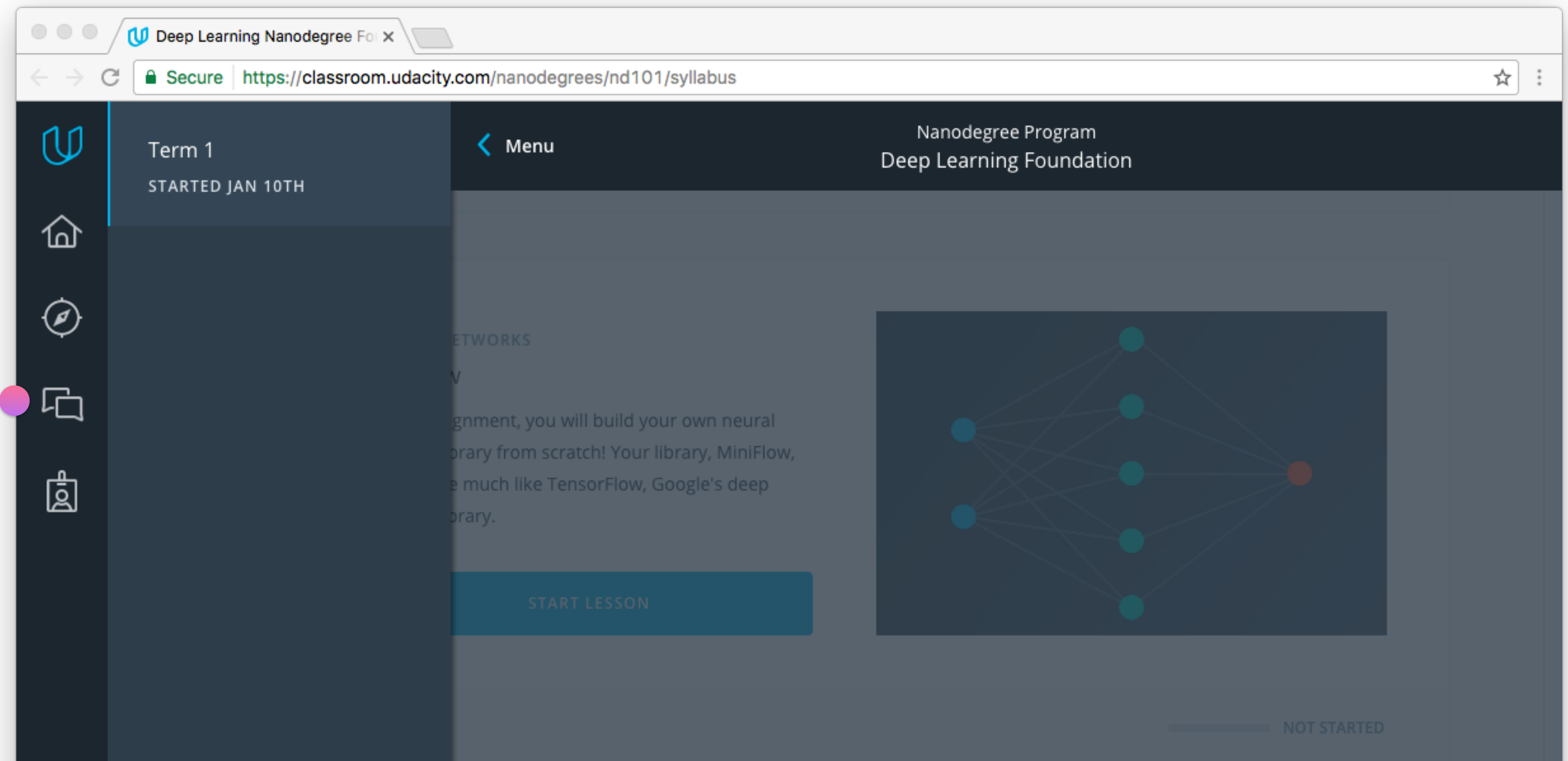


# Find Forums in the Classroom

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!

# Support

Reach out anytime. Udacity has dedicated support for the Deep Learning Nanodegree Foundations 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 Foundations FAQ** and **general Udacity FAQ**.



# Class Timeline Pacing

This is a unique, 17 week-long program that will bring students a new lesson on a weekly basis. 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 Friday at 5pm (Pacific), Siraj will release his initial video covering a concept.

Every Wednesday at 10am (Pacific), Siraj will conduct a one hour live session on this concept.

Every Wednesday, we will release more in-depth content related to this concept.

# Class Timeline Curriculum

## WEEK 1

Types of Machine Learning and when to use Machine Learning

Live session: Linear regression from scratch

## WEEK 2

Neural Network Architecture + Types

Live session: Numerical classification from scratch

## WEEK 3

Cloud computing + sentiment analysis

Live session: Sentiment Analysis from scratch + cloud computing detailed instructions

## WEEK 4

Math Notation + recommender systems

Live session: Various math examples + recommender system from scratch

## WEEK 5

Data preparation (cleaning, regularization, dimensionality reduction)

Live session: Data prep from scratch



## WEEK 6

Drone image tracking

Live session: Image classification from scratch

## WEEK 7

Stock prediction

Live session: Stock prediction from scratch

## WEEK 8

Art generation

Live session: Artistic Style transfer from scratch

## WEEK 9

Music generation (LSTMs applied to Audio)

Live session: Generating music from scratch

## WEEK 10

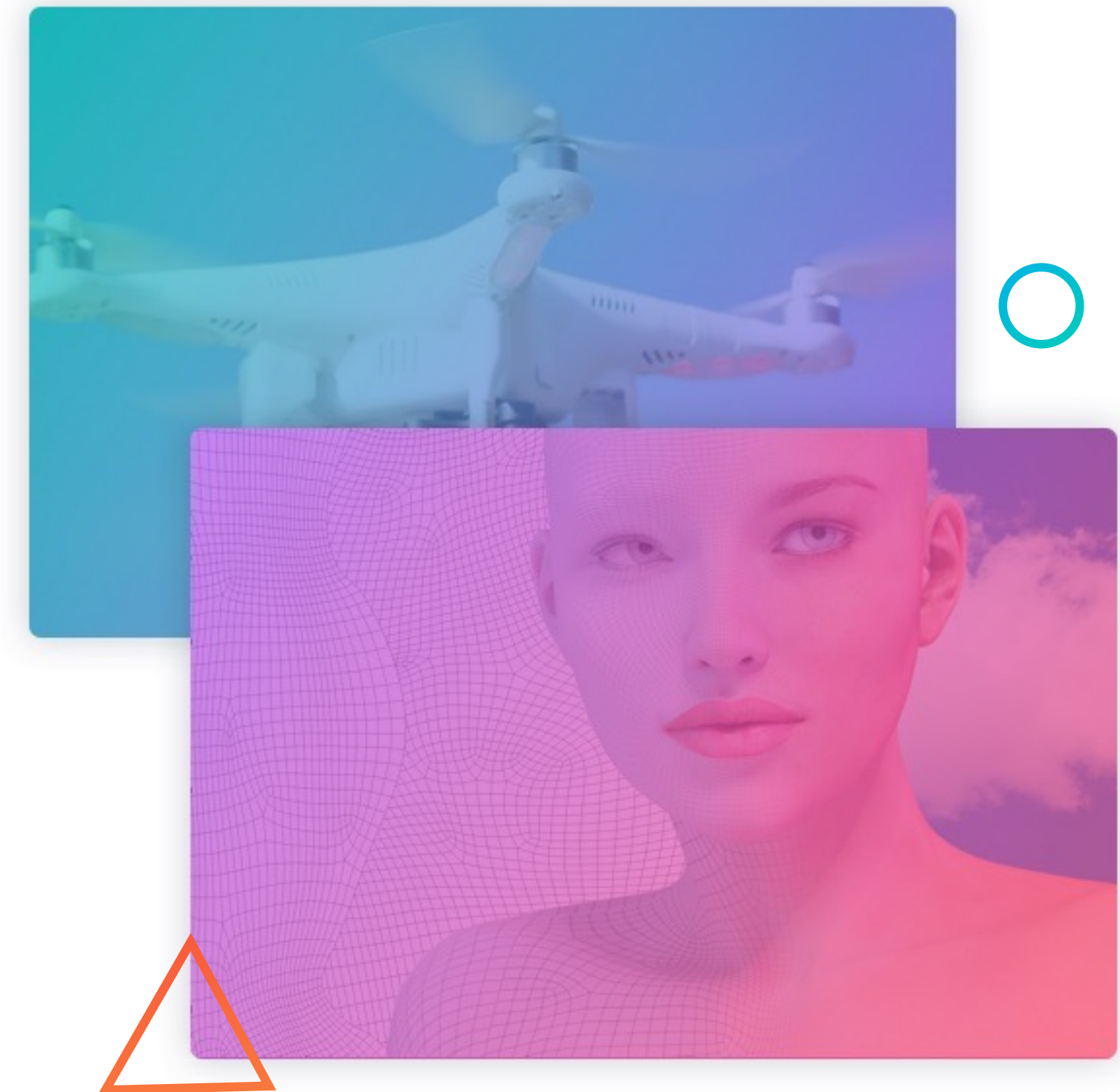
Poetry generation (LSTMs applied to NLP)

Live session: Text generation from scratch

## WEEK 11

Language translation (sequence to sequence)

Live session: Language translation from scratch



WEEK 12

Chatbot QA System with voice

Live session: Chatbot from scratch

WEEK 13

Game bot 2D (reinforcement learning via Monte-Carlo tree search)

Live session: Game bot from scratch

WEEK 14

Image compression

Live session: Autoencoder from scratch

WEEK 15

Data visualization

Live session: Data visualization from scratch

WEEK 16

Image generation

Live session: Generative adversarial network from scratch

WEEK 17

One-shot learning (Probabilistic Programming)

Live session: One shot learning from scratch





# 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 pass all projects within 6 months of the start of the program. Passing means a Udacity Reviewer has marked your project as “Meets Specifications.”

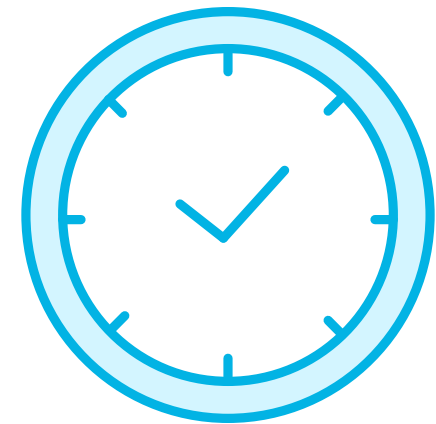
**Individual project deadlines:** In order to guarantee the start date of your choice for the Artificial Intelligence or Self-Driving Car Nanodegree programs (example: June start date), you must not miss more than 1 individual project deadline. [See project deadlines here.](#)

# Class Timeline **Missing Deadlines**

**If you do not complete all projects within 6 months of the start of the program,** you will not qualify for graduation. You will be removed from the program and will need to re-enroll if you would like to continue.

**If you miss more than one individual project deadline,** you will lose your option to choose your start date for the Artificial Intelligence or Self-Driving Car Nanodegree programs. Instead, we will assign you a start date. Note that you are still eligible to graduate the program if you complete all projects within 6 months of the start of the program.

# Class Timeline **Time Dedication**




**3 HOURS / WEEK**

Between instructional content, projects, and other course-related activity, we estimate that investing 3 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](#) and in [this Google Doc](#).



<b>Jan 27<sup>th</sup></b>	First Day of Class
<b>Project 1</b>	Your First Neural Network
<b>Project 2</b>	Object Recognition
<b>Project 3</b>	Generate TV Scripts
<b>Project 4</b>	Make a Translation Chatbot
<b>Project 5</b>	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 (cont.)

## LIVE SESSIONS

Every Wednesday, Siraj will hold a 1 hour live session with students. This is an opportunity to ask questions on class content, but also an opportunity to see fellow students' questions and interact.

## 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](#) or [Self-Driving Car Nanodegree programs](#). Graduates will also receive \$100 off of the first term of either of the above Nanodegrees.

Both 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. You'll be equipped with additional 1:1 mentorship and career support to get you on your path to becoming an engineer in the field.

# Policy

## COST

This Nanodegree Foundations program costs \$399.

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



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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 Companion Book

[Grokking Deep Learning](#) by Andrew W Trask (First five chapters)

# 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)

# 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)



# Books

[Deep Learning](#) (Ian Goodfellow, Joshua Bengio, Aaron Courville)

[Neural Networks and Deep Learning](#) (Michael Neilsen)

# 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!