26.10.21

OPENCAMPUS.sh

Machine Learning With TensorFlow

INTRODUCTION TO NEURAL NETS AND TOOLS

INTRODUCTION

- Organizational Matters
- Introductory Discussion on AI
- Coursera Registration
- Using Google Colab
- Neural Net Basics
- TensorFlow
- Course Projects

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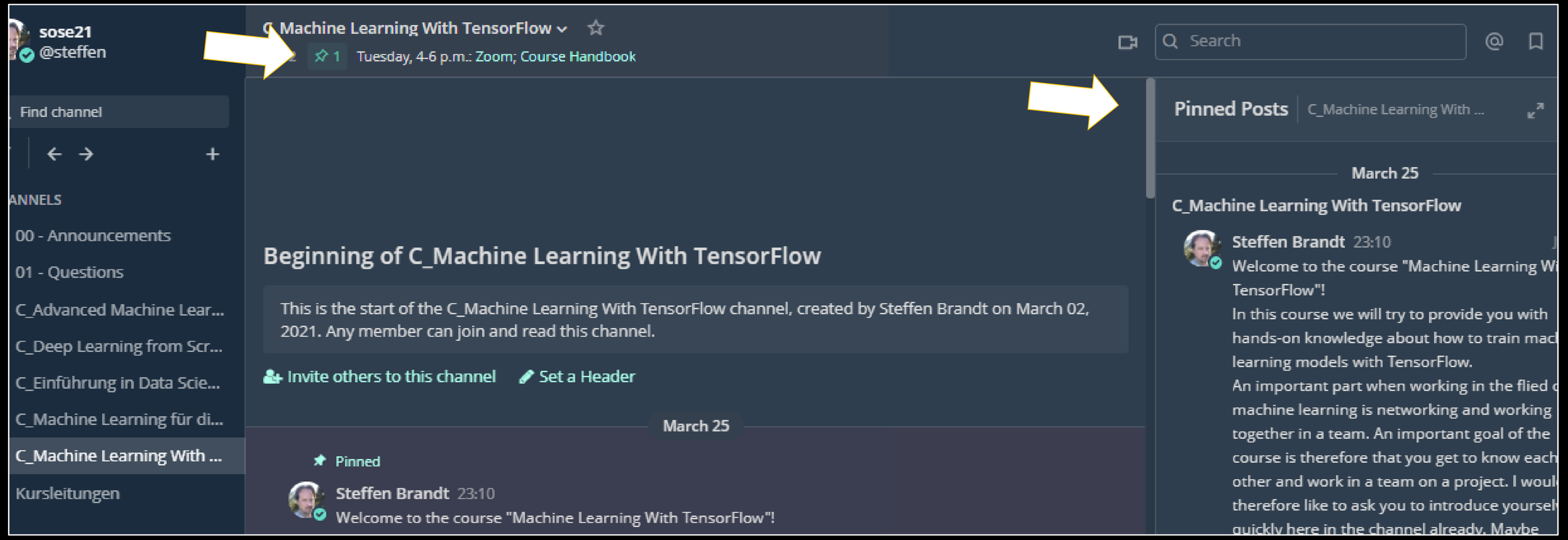
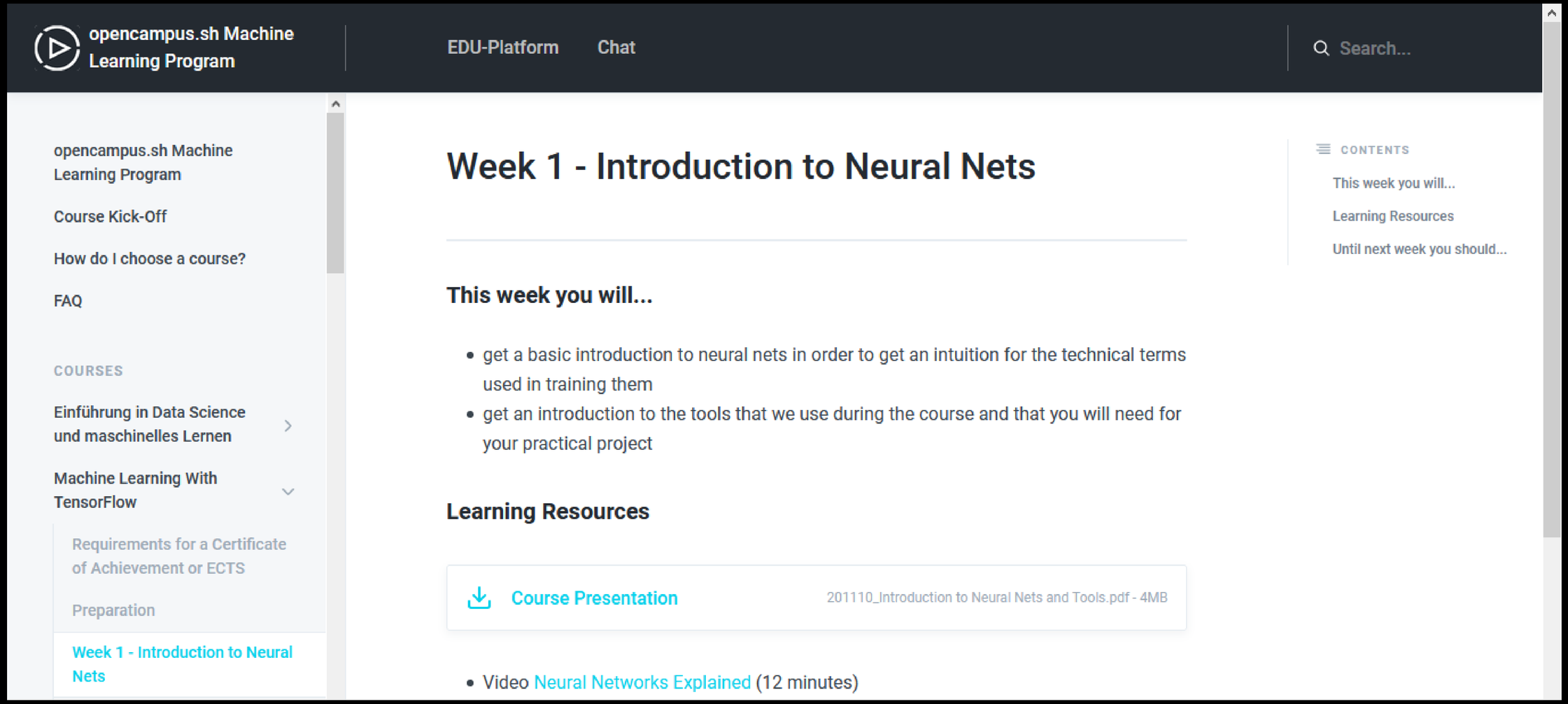
2021-10-24 19:42:14

CHAT


sose21
@steffen
Find channel
ANNELS
00 - Announcements
01 - Questions
C_Advanced Machine Lear...
C_Deep Learning from Scr...
C_Einführung in Data Scie...
C_Machine Learning für di...
C_Machine Learning With ...
Kursleitungen
Machine Learning With TensorFlow
1
Tuesday, 4-6 p.m.: Zoom; Course Handbook
Search
Beginning of C_Machine Learning With TensorFlow
This is the start of the C_Machine Learning With TensorFlow channel, created by Steffen Brandt on March 02, 2021. Any member can join and read this channel.
Invite others to this channel
Set a Header
March 25
Pinned
Steffen Brandt 23:10
Welcome to the course "Machine Learning With TensorFlow"!
Pinned Posts
C_Machine Learning With ...
March 25
C_Machine Learning With TensorFlow
Steffen Brandt 23:10
Welcome to the course "Machine Learning Wi
TensorFlow"!
In this course we will try to provide you with
hands-on knowledge about how to train mac
learning models with TensorFlow.
An important part when working in the flied
machine learning is networking and working
together in a team. An important goal of the
course is therefore that you get to know each
other and work in a team on a project. I woul
therefore like to ask you to introduce yoursel
quickly here in the channel already. Maybe

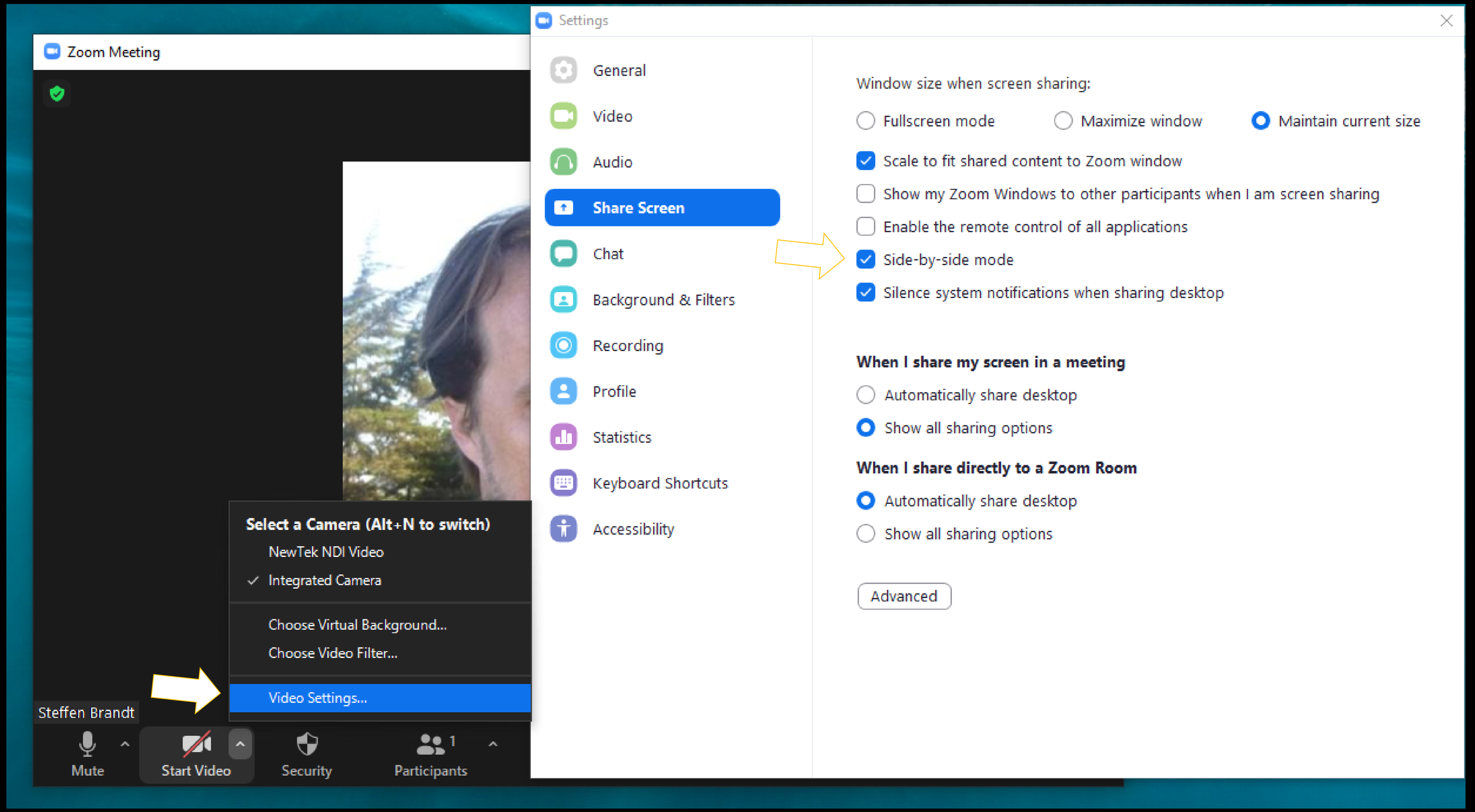
KURSHANDBUCH



ZOOM

- Try the different viewing modes:
  - Gallery View/ Active Speaker
  - Split Screen/ Full Screen Mode

- Maybe watch this video to get an idea: https://www.youtube.com/watch?v=v3IPAbpVjd4


Zoom Meeting
Steffen Brandt
Mute
Start Video
Security
Participants
1
Select a Camera (Alt+N to switch)
NewTek NDI Video
Integrated Camera
Choose Virtual Background...
Choose Video Filter...
Video Settings...
Settings
General
Video
Audio
Share Screen
Chat
Background & Filters
Recording
Profile
Statistics
Keyboard Shortcuts
Accessibility
Window size when screen sharing:
Fullscreen mode
Maximize window
Maintain current size
Scale to fit shared content to Zoom window
Show my Zoom Windows to other participants when I am screen sharing
Enable the remote control of all applications
Side-by-side mode
Silence system notifications when sharing desktop
When I share my screen in a meeting
Automatically share desktop
Show all sharing options
When I share directly to a Zoom Room
Automatically share desktop
Show all sharing options
Advanced

ORGANIZATIONAL

- Use your full names in the zoom meetings!
- Complete your profile in the mattermost chat with your full name and a foto.
- Please write me if you will not go on with the course!

26. 10. **16: 00- 17: 45**	INTRODUCTION TO NEURAL NETS AND TOOLS USED DURING THE COURSE Starterkitchen, Kuhnkestraße 6, Wissenschaftspark
02. 11. **16: 00- 17: 45**	INTRODUCTION TO TENSORFLOW FOR AI, MACHINE LEARNING, AND DEEP LEARNING, PART I
09. 11. **16: 00- 17: 45**	INTRODUCTION TO TENSORFLOW FOR AI, MACHINE LEARNING, AND DEEP LEARNING, PART II
16. 11. **16: 00- 17: 45**	CONVOLUTIONAL NEURAL NETWORKS, PART I
23. 11. **16: 00- 17: 45**	CONVOLUTIONAL NEURAL NETWORKS, PART II
30. 11. **16: 00- 17: 45**	NATURAL LANGUAGE PROCESSING, PART I

07. 12. **16: 00- 17: 45**	NATURAL LANGUAGE PROCESSING, PART II
14. 12. **16: 00- 17: 45**	SEQUENCES, TIME SERIES AND PREDICTION, PART I
04. 01. **16: 00- 17: 45**	SEQUENCES, TIME SERIES AND PREDICTION, PART II
11. 01. **16: 00- 17: 45**	SPECIAL ISSUES CONSIDERING YOUR FINAL PROJECTS
18. 01. **16: 00- 17: 45**	PRESENTATION OF THE FINAL PROJECTS, PART I
25. 01. **16: 00- 17: 45**	PRESENTATION OF THE FINAL PROJECTS, PART II

FIRST BREAKOUT

- 15 Minutes
- Present yourself
- Question: What is Artificial Intelligence?
  - Get to a common definition
  - Write it down

“What's the difference between data science, machine learning, and artificial intelligence?”

http://varianceexplained.org/r/ds-ml-ai

Data science produces insights.

Machine learning produces predictions.

Artificial intelligence produces actions.

ARTIFICIAL INTELLIGENCE

„an autonomous agent executes or recommends actions“

(Poole, Mackworth, & Goebel, 1998)

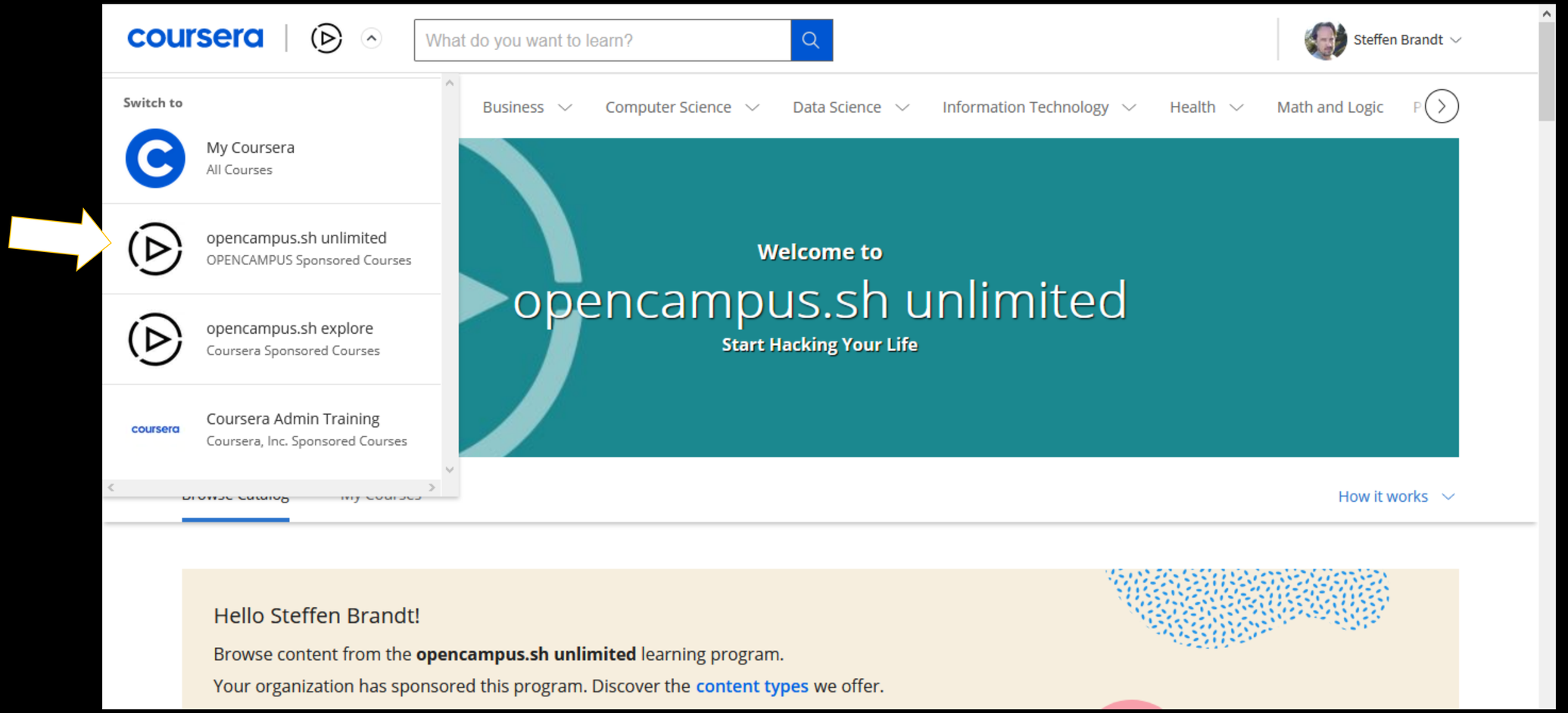
„Systems with 'intelligent' behavior that analyze their environment and act with a certain degree of autonomy to achieve certain goals. “

(European Commission, 2018)

„By artificial intelligence we mean highly developed software systems that are capable of learning and training to master complex tasks.“

(AI-Strategy of the State Schleswig-Holstein, 2019)

COURSERA REGISTRATION



coursera | What do you want to learn? Steffen Brandt

Browse content from the **opencampus.sh unlimited** learning program.

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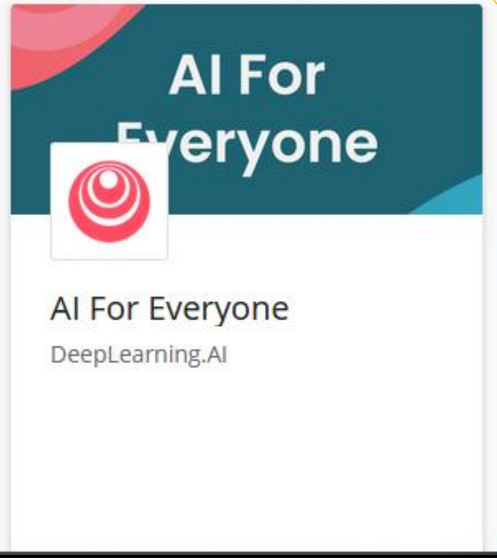
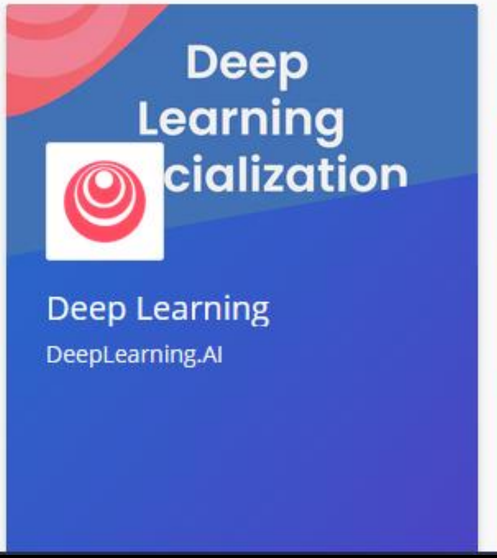
Machine Learning



AI For Everyone
DeepLearning.AI

DeepLearning.AI TensorFlow Developer
DeepLearning.AI



Deep Learning
DeepLearning.AI

AI for Medicine
DeepLearning.AI

PROFESSIONAL CERTIFICATE

DeepLearning.AI TensorFlow Developer

Offered by

DeepLearning.AI

Enrolled | Go to Course | Save for Later

Sponsored by OPENCAMPUS

About this Professional Certificate

TensorFlow is one of the most in-demand and popular open-source deep learning frameworks available today. The DeepLearning.AI TensorFlow Developer Professional Certificate program teaches you applied machine learning skills with TensorFlow so you can build and train powerful models.

In this hands-on, four-course Professional Certificate program, you'll learn the necessary tools to build scalable AI-powered applications with TensorFlow. After finishing this program, you'll be able to apply your new TensorFlow skills to a wide range of problems and projects. This program can help you prepare for the Google TensorFlow Certificate exam and bring you one step closer to achieving the Google TensorFlow Certificate.

Shareable Certificate
Earn a Certificate upon completion

100% online courses
Start instantly and learn at your own schedule.

Flexible Schedule
Set and maintain flexible deadlines.

deeplearning.ai **DeepLearning.AI TensorFlow Developer Professional Certificate** Enrolled

About How It Works Courses Instructors Enrollment Options FAQ

COURSE 1

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

4.7 12.904 ratings • 2.739 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 2

Convolutional Neural Networks in TensorFlow

4.7 5.658 ratings • 858 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 3

Natural Language Processing in TensorFlow

4.6 4.631 ratings • 711 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This Specialization will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

COURSE 4

Sequences, Time Series and Prediction

4.6 3.279 ratings • 526 reviews

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This Specialization will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

Introduction to TensorFlow for Artificial Intelligence, Machine Learning, and Deep Learning

4.7 14,803 ratings • 3,104 reviews

Enrolled | Go to Course

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Offered by DeepLearning.AI

About this Course

If you are a software developer who wants to build scalable AI-powered algorithms, you need to understand how to use the tools to build them. This course is part of the upcoming Machine Learning in Tensorflow Specialization and will teach you best practices for using TensorFlow, a popular open-source framework for machine learning.

SHOW ALL

Shareable Certificate
Earn a Certificate upon completion

100% online
Start instantly and learn at your own schedule.

Flexible deadlines
Reset deadlines in accordance to your schedule.

Intermediate Level

coursera

For Enterprise

Steffen Brandt

Browse > Data Science > Machine Learning

DeepLearning.AI TensorFlow Developer Professional Certificate

4.7 15.626 ratings

Laurence Moroney

Offered By

DeepLearning.AI

Enrolled

Already enrolled

115,497 already enrolled

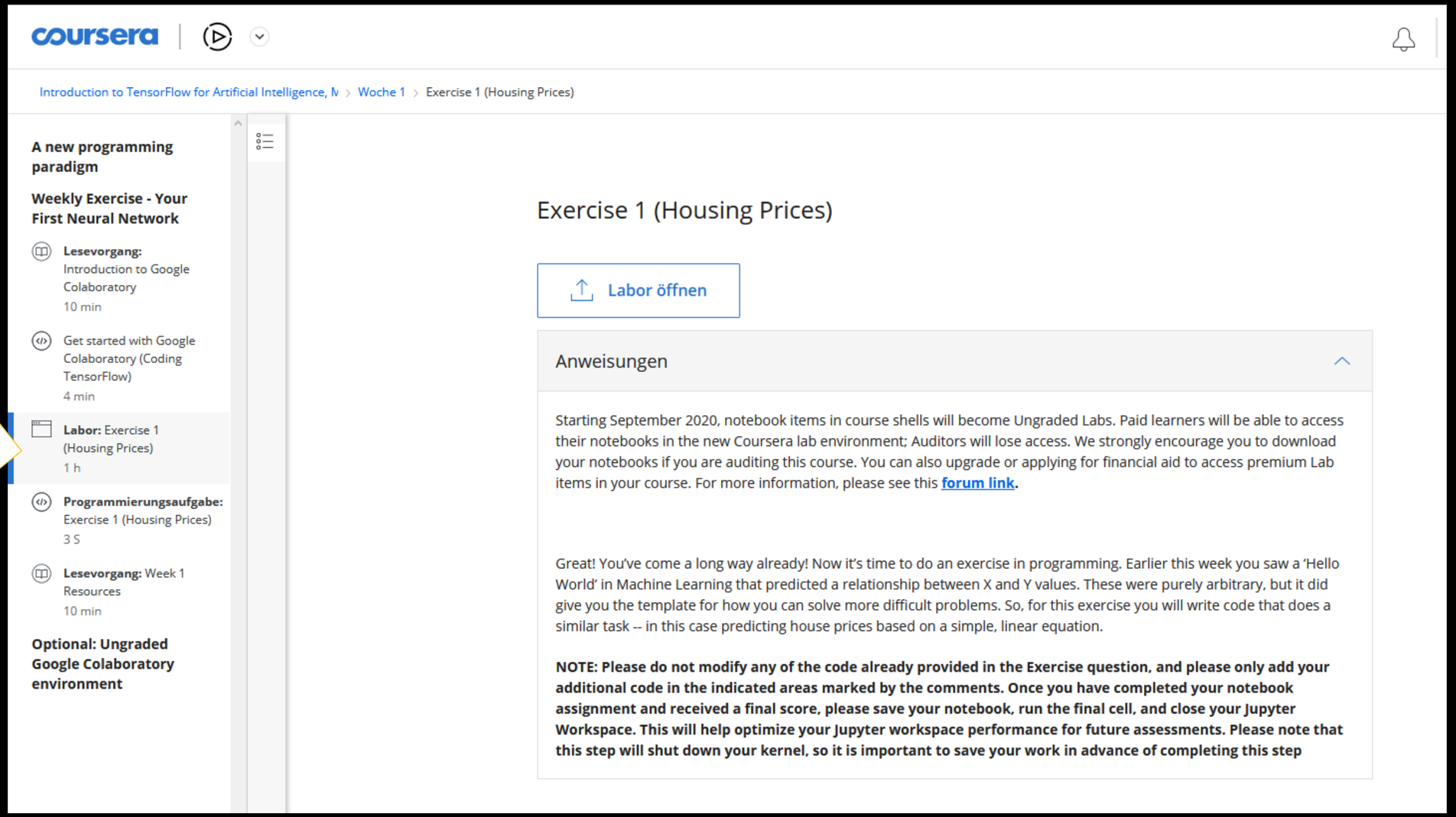
About | How It Works | Courses | Instructors | Enrollment Options | FAQ

WHAT YOU WILL LEARN

- Best practices for TensorFlow, a popular
- Handle real-world image data and explore

LEARNER CAREER OUTCOMES

EXERCISES (LABS)



EXERCISES

- Each week two to four of you will present the exercises
- Each of you presents at least once

GOOGLE COLAB

Google Colab

Programming Environment to develop and train Neural Networks in the Google Cloud

Colab is an online **programming environment** for Python including a free runtime with a GPU and is the standard programming environment for our machine learning projects.

The following blog article provides you with a great written introduction to Google Colab:

Google Colab 101 Tutorial with Python—Tips, Tricks, and FAQ

An in-depth tutorial on how to use Google Colab with Python, along with Colab's tips, tricks, and FAQ

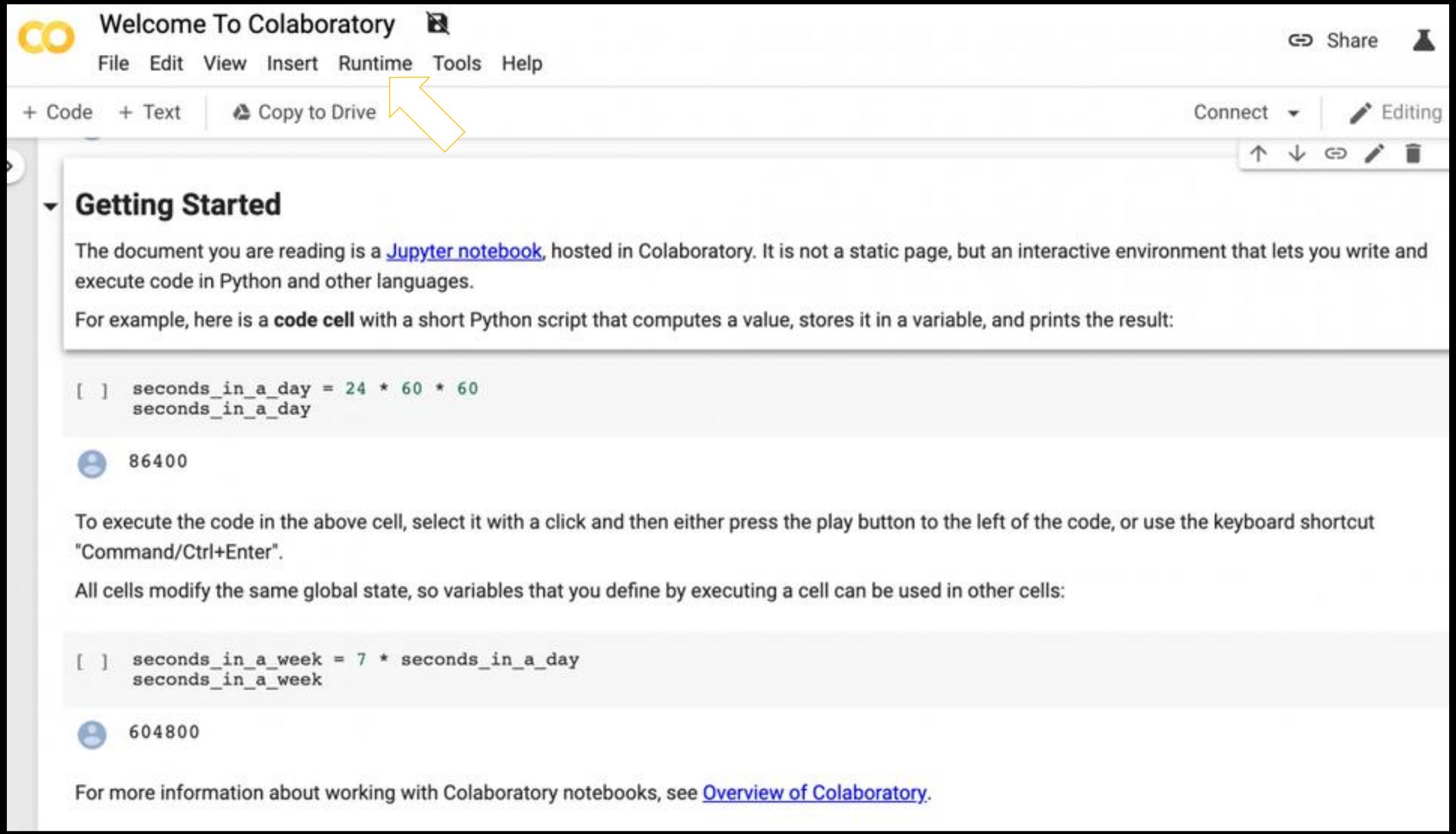
medium.com

If you want to get a little bit deeper into using Colab, make sure to also read this blog article:

Configuring Google Colab Like A Pro

How to Do Research Quality Machine Learning on a Budget

medium.com


Welcome To Colaboratory
File Edit View Insert Runtime Tools Help
Share
+ Code + Text
Copy to Drive
Connect
Editing
Getting Started
The document you are reading is a Jupyter notebook, hosted in Colaboratory. It is not a static page, but an interactive environment that lets you write and execute code in Python and other languages.
For example, here is a code cell with a short Python script that computes a value, stores it in a variable, and prints the result:
[ ] seconds_in_a_day = 24 * 60 * 60
seconds_in_a_day
86400
To execute the code in the above cell, select it with a click and then either press the play button to the left of the code, or use the keyboard shortcut "Command/Ctrl+Enter".
All cells modify the same global state, so variables that you define by executing a cell can be used in other cells:
[ ] seconds_in_a_week = 7 * seconds_in_a_day
seconds_in_a_week
604800
For more information about working with Colaboratory notebooks, see Overview of Colaboratory.

Setup Hardware Accelerator GPU in Colab

Steps to setup GPU:

- Go to Runtime → Change runtime type.
- Select "**GPU**" from the popup

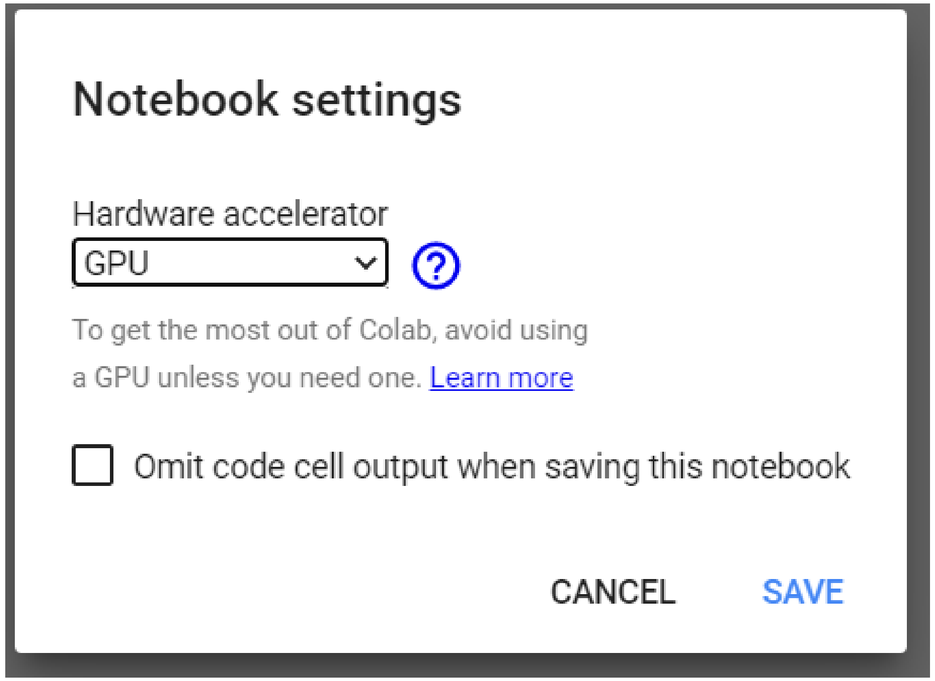
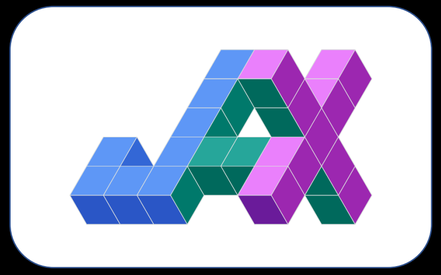
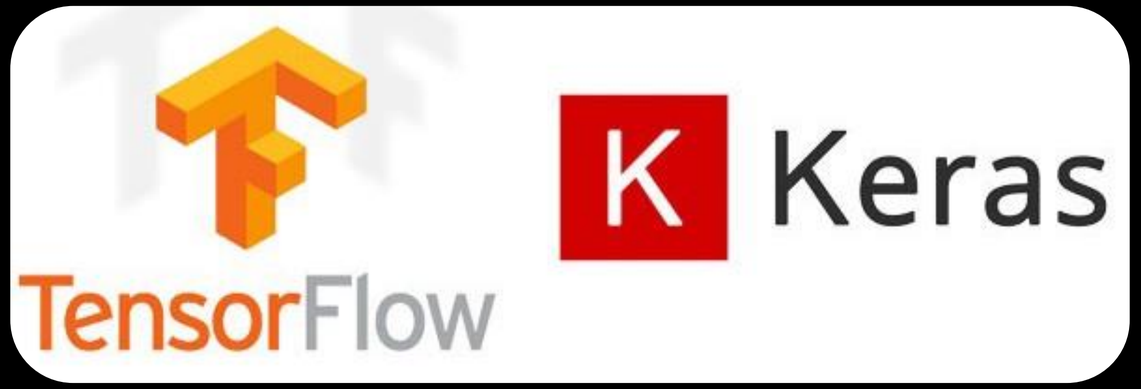


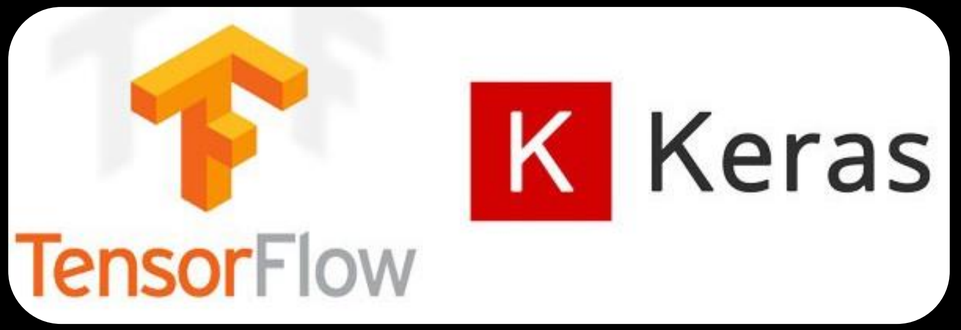
Figure 14: Screenshot of GPU's accelerator selection.


PYTORCH

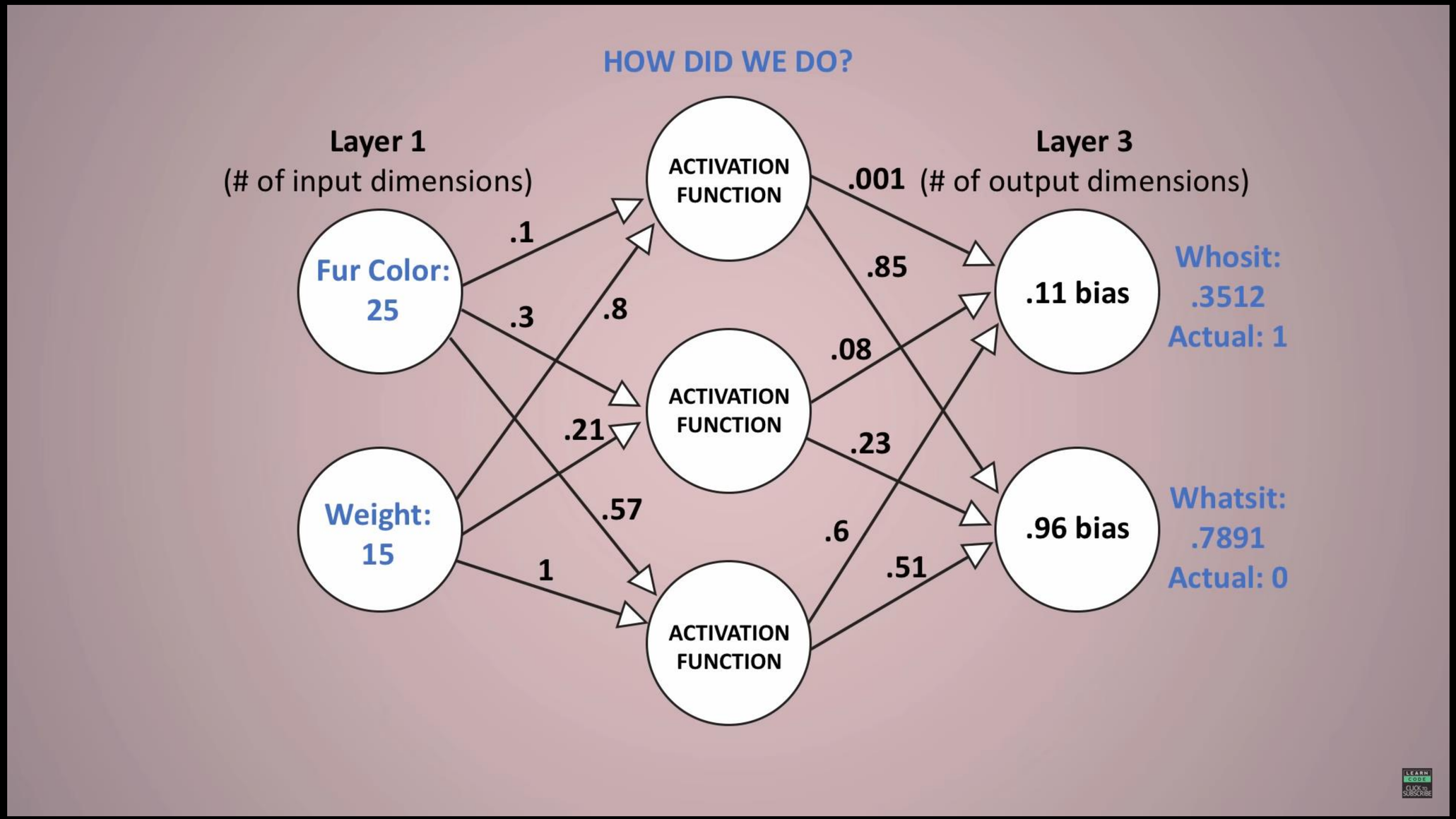

scikit
learn




TensorFlow
K
Keras



- **Feb 2017:** TensorFlow 1.0 (Estimator API)
- **Nov 2017:** TensorFlow 1.4 (Estimator API, Keras API)
- **Jan 2019:** TensorFlow 2.0 (Estimator API, Keras API)


HOW DID WE DO?
Layer 1
(# of input dimensions)
Layer 3
(# of output dimensions)
ACTIVATION FUNCTION
ACTIVATION FUNCTION
ACTIVATION FUNCTION
Fur Color: 25
Weight: 15
.11 bias
.96 bias
.001
.1
.3
.8
.85
.08
.21
.23
.57
.6
1
.51
Whosit: .3512 Actual: 1
Whatsit: .7891 Actual: 0

COURSE PROJECTS

There are different options:

- **Your own data and project**
- **Pick a challenge from the list in the course handbook**
- **Talk to a company or a chair at your local higher education institutions for possible projects**
- **Look for a dataset on the Internet and define a challenge**

Possible Projects

You are very welcome to bring your own data and project idea to a course. Simply talk to your course lead about your idea and the goal of the project until the end of the semester.

Further, we are offering a list of possible projects with corresponding datasets, you can use as project (see table below). Please, also talk to your course lead if you want to work on oe of these challenges as your course project.

A further option is that you talk to local companies or chairs at your local higher education institutions if they are interested in a machine learning protoytpe for some of their production or research tasks and would like to share the corresponding data. If you find a partner that would be interested in such a project, we will be happy to support you in the definition of the project together with the partner and also, for example, with setting up a non-disclosure agreement for the provided data.

A final option is that you look for an interesting dataset on the Internet and define yourself a project based on this dataset. However, we would very much recommend you to choose one of the before mentioned options. With datasets from the Interenet (e.g. from Kaggle competitions) your main challenge is typically limited to optimizing the model with an already prepared dataset. However, in practice the challenge is more often to construct the right training and validation datasets and construct the right features.

Title	Description	Dataset
	On a good surfing day for a particular surf spot, the number of pageviews on the site with the forecasts for that spot usually increases. The number of pageviews shall be used as a proxy for the quality of	Weather station data of 7 popular surf spots (Kiel Lighthouse, Skt. Peter-Ording,

Requirements

In order to receive ECTS for a course you have to complete a machine learning project by yourself or preferably in a team with a maximum of 4 participants.

Typically the project work starts in the middle of the course.

The requirement for this semester are:

1. Presentation of a detailed Jupyter Notebook with code and comment
   - including the definition of the environment
   - including required sections (Introduction, Data and Methods, Results, Baseline)
2. A small video, accompanying, for example, a screen recording of the notebook with an explanation of the challenge of the project, the used approach, and the results.
3. A statement that the code is released as open source software.
   The data you use in your project can remain private if you wish.

Details about the requirements of the project will additionally be discussed in the course.

Please ask about whatever may be unclear, preferably before you start the project.

TASKS UNTIL NEXT WEEK

- Completion of the learning material of week 1 and 2 of the course "introduction to TensorFlow“
- Complete Exercises 1 and 2 of the above course
- Bring questions!