

Syllabus: Introduction to Data Science with Python

TU Berlin Summer University 2019 Term 4

Week 1 August 19th-23rd

	19	20	21	22	23
	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 - 10:30	<p>Welcome Day!</p> <p>Room H 0112, ground floor, TUB main building</p> <p>10:30: Orientation session</p> <p>12:30-13:15: Buffet lunch</p> <p>13:30-15:30: First class session</p> <p>15:30-16:15: Campus Tour</p> <p>16:15-16:45: Coffee & Cake</p>	Introduction to Data Science	Explorative Data Analysis I: Data Manipulation	Explorative Data Analysis II: Data Visualization	Introduction to Machine Learning I: Mathematical Basics
11:00 - 12:30		Introduction to Python	Practical Session: Explorative Data Analysis I	Introduction to Statistical Tests	Introduction to Machine Learning II: Models and Application
13:30 - 15:30		Practical Session: Python	Cultural Program	Practical Session: Explorative Data Analysis II	Practical Session: Machine Learning with sklearn
16:00 +					Cultural Program

Week 2 August 26th-30th

	26	27	28	29	30
	Monday	Tuesday	Wednesday	Thursday	Friday
9:00 - 10:30	Homework review	ML Expert Guest Talk	ML Workshop I	Data Representation and Model Evaluation	Advanced Models in Machine Learning
11:00 - 12:30	Linear Models and Regression	Neural Networks I: MLP	ML Workshop II	Exam	The future of Data Science and ML
13:30 - 15:30	Classification	Neural Network II: CNN	Cultural Program	Exam	Ethical Discussion
16:00 +	Cultural Program				Certificates Ceremony Room H3005, 3 rd floor, TU Berlin main building

Key

Lecture	Field Trip or Practical	Assessment	Cultural Program activity*
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*The cultural program timetable will be emailed to you shortly before your course starts. For more information about the cultural program, and for examples of previous schedules, head here:

https://www.tu-berlin.de/menue/summer_university/cultural_program/

Assessment information

You will be assessed in the following ways:

- Practical Sessions
- One Practical Homework
- Written Exam

Your assessments will be weighted as follows:

- Participation in Practical Sessions 25%
- Homework Assignment 35%
- Written Exam 40%

Grading information

All participants of the TU Berlin Summer & Winter University are required to select their grading option at the time of registration. The two options available are (i) graded or (ii) pass/fail.

All participants who select option (i) graded, will receive a grade under the German grading system. The following table provides an overview of the grading system and equivalent scores for international credit transfers:

Total mark	German grade	English description
More or equal to 95	1,0	Excellent
More or equal to 90	1,3	Very good
More or equal to 85	1,7	Good
More or equal to 80	2,0	Good
More or equal to 75	2,3	Good
More or equal to 70	2,7	Satisfactory
More or equal to 65	3,0	Satisfactory
More or equal to 60	3,3	Satisfactory
More or equal to 55	3,7	Sufficient
More or equal to 50	4,0	Sufficient
Less than 50	5,0	Failed

Credit Points

ECTS is a point system and European standard developed by the Commission of the European Community. ECTS stands for European Credit Transfer System. The aim is to provide common procedures and guarantee academic recognition of studies abroad. The credit system is based on student workload. All lectures, seminars, excursions and homework count towards the workload. One point is awarded for the equivalent of 25-30 hours of workload.

Reading list

Here are reading materials which will be used or referred to during the course. You are not required to read these in advance – this is for your information and reference.

Watching the Google 1 hour Python Class on Youtube before the course is highly recommended.

All sources below are available either open source, in the TU Berlin library, or will be provided to you directly by your lecturers, during the course.

To search resources available in the TU Berlin library, check here: <https://www.ub.tu-berlin.de/en/searching-for-resources/>

1. **Google Python Class on Youtube (<https://youtu.be/tKTZoB2Vjuk>)**
2. Müller, Andreas C., and Sarah Guido. *Introduction to machine learning with Python: a guide for data scientists*. " O'Reilly Media, Inc.", 2016.
3. Raschka, Sebastian, and Vahid Mirjalili. *Python machine learning*. Packt Publishing Ltd, 2017.
4. Grus, Joel. *Data science from scratch: first principles with python*. " O'Reilly Media, Inc.", 2015.
5. Bishop, Christopher M. *Pattern recognition and machine learning*. Springer, 2006.
6. Goodfellow, Ian, Yoshua Bengio, and Aaron Courville. *Deep learning*. MIT press, 2016.