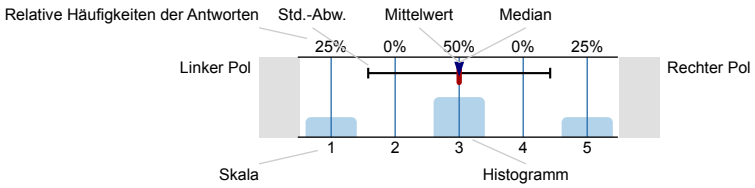
Matthias Carl Laupichler

ML Foundations in Python (03/23) ()
Erfasste Fragebögen = 16

Auswertungsteil der geschlossenen Fragen

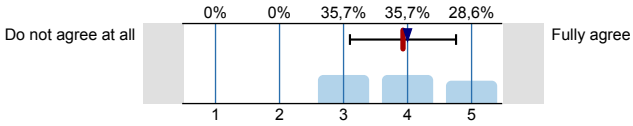
Legende

Fragetext



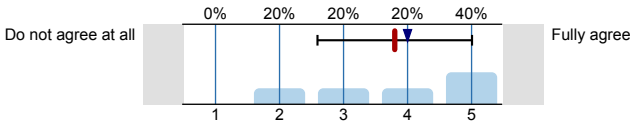
1. Evaluation of "Machine Learning Foundations in Python"

1.1) The course is useful for conducting my research projects.



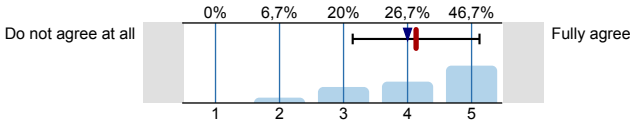
n=14
mw=3,9
md=4
s=0,8
E.=2

1.2) I can use what I have learned independently in my research projects.



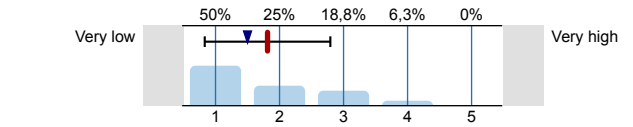
n=15
mw=3,8
md=4
s=1,2
E.=1

1.3) The amount of examples in the course was appropriate.



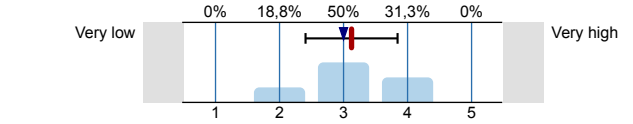
n=15
mw=4,1
md=4
s=1
E.=1

1.4) **Python programming (in general):**
My skills in this area *before* starting the course were...



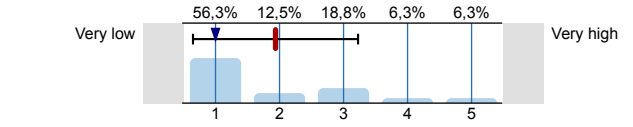
n=16
mw=1,8
md=1,5
s=1

1.5) **Python programming (in general):**
My skills in this area are *now*...



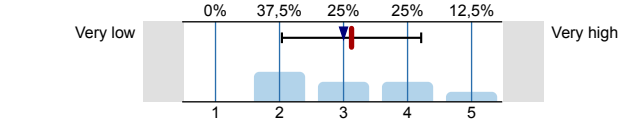
n=16
mw=3,1
md=3
s=0,7

1.6) **I can use the Linux terminal/console.**
My skills in this area *before* starting the course were...



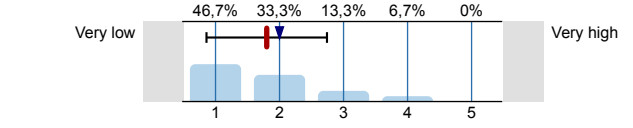
n=16
mw=1,9
md=1
s=1,3

1.7) **I can use the Linux terminal/console.**
My skills in this area are *now*...



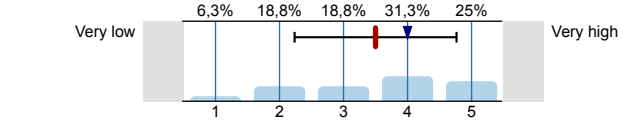
n=16
mw=3,1
md=3
s=1,1

1.8) **I can explain gradient descent techniques.**
My skills in this area *before* starting the course were...



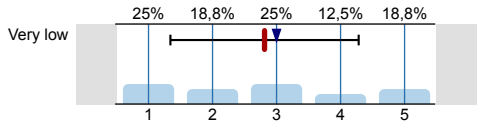
n=15
mw=1,8
md=2
s=0,9

1.9) **I can explain gradient descent techniques.**
My skills in this area are *now*...



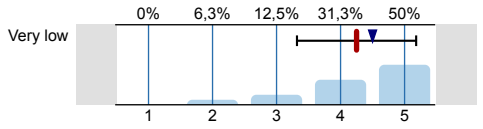
n=16
mw=3,5
md=4
s=1,3

1.10) **I can calculate descriptive statistics like mean, variance, and distribution in Python.**
My skills in this area *before* starting the course were...



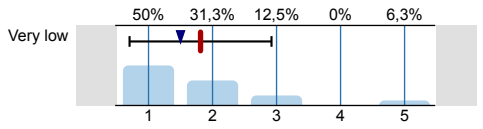
n=16
mw=2,8
md=3
s=1,5

1.11) **I can calculate descriptive statistics like mean, variance, and distribution in Python.**
My skills in this area are *now*...



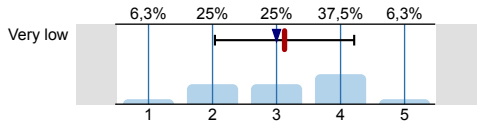
n=16
mw=4,3
md=4,5
s=0,9

1.12) **I can explain the concept of Eigenvalues and their importance for PCA.**
My skills in this area *before* starting the course were...



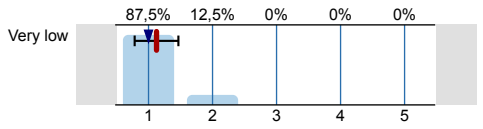
n=16
mw=1,8
md=1,5
s=1,1

1.13) **I can explain the concept of Eigenvalues and their importance for PCA.**
My skills in this area are *now*...



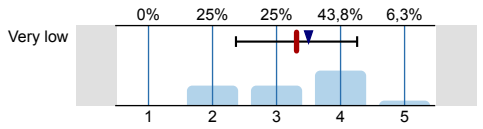
n=16
mw=3,1
md=3
s=1,1

1.14) **I can demonstrate how k-nearest neighbors algorithms work in Python.**
My skills in this area *before* starting the course were...



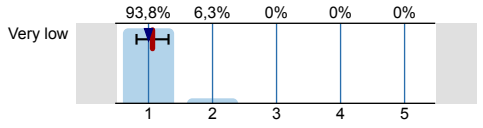
n=16
mw=1,1
md=1
s=0,3

1.15) **I can demonstrate how k-nearest neighbors algorithms work in Python.**
My skills in this area are *now*...



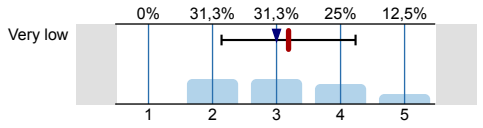
n=16
mw=3,3
md=3,5
s=0,9

1.16) **I can demonstrate how support vector machine algorithms work in Python.**
My skills in this area *before* starting the course were...



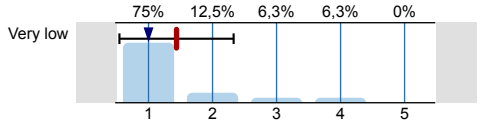
n=16
mw=1,1
md=1
s=0,3

1.17) **I can demonstrate how support vector machine algorithms work in Python.**
My skills in this area are *now*...



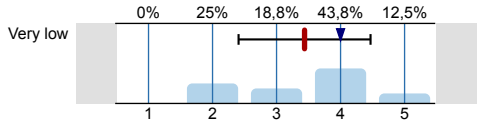
n=16
mw=3,2
md=3
s=1

1.18) **I can demonstrate how decision tree and random forest algorithms work in Python.**
My skills in this area *before* starting the course were...



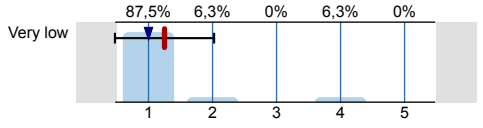
n=16
mw=1,4
md=1
s=0,9

1.19) **I can demonstrate how decision tree and random forest algorithms work in Python.**
My skills in this area are *now*...



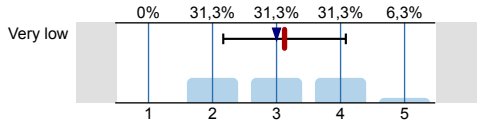
n=16
mw=3,4
md=4
s=1

1.20) **I can demonstrate how k-means algorithms work in Python.**
My skills in this area *before* starting the course were...



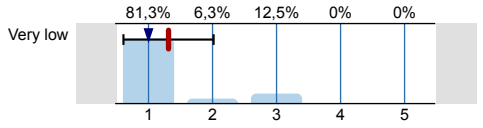
n=16
mw=1,3
md=1
s=0,8

1.21) **I can demonstrate how k-means algorithms work in Python.**
My skills in this area are *now*...



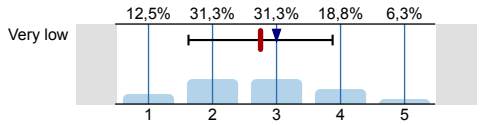
n=16
mw=3,1
md=3
s=1

1.22) **I can explain the concept of Gaussian mixture models.**
My skills in this area *before* starting the course were...



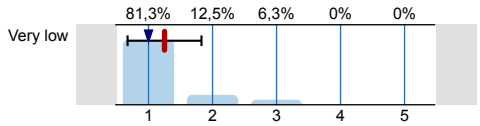
n=16
mw=1,3
md=1
s=0,7

1.23) **I can explain the concept of Gaussian mixture models.**
My skills in this area are *now*...



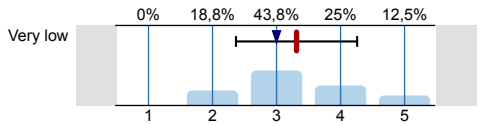
n=16
mw=2,8
md=3
s=1,1

1.24) **I can use PCA for dimensionality reduction in Python.**
My skills in this area *before* starting the course were...



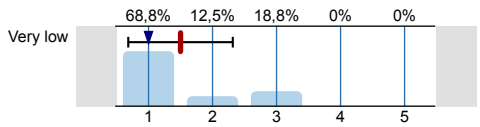
n=16
mw=1,3
md=1
s=0,6

1.25) **I can use PCA for dimensionality reduction in Python.**
My skills in this area are *now*...



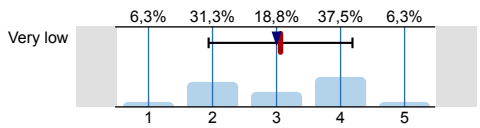
n=16
mw=3,3
md=3
s=0,9

1.26) **I can explain the concepts of feedforward neural networks and convolutional neural networks.**
My skills in this area *before* starting the course were...



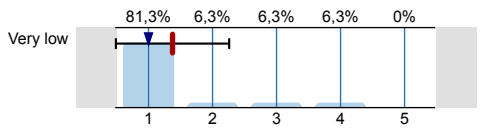
n=16
mw=1,5
md=1
s=0,8

1.27) **I can explain the concept of feedforward neural networks and convolutional neural networks.**
My skills in this area are *now*...



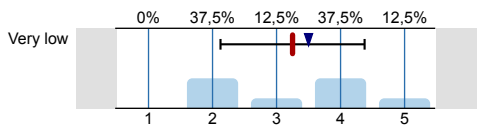
n=16
mw=3,1
md=3
s=1,1

1.28) **I can demonstrate the training process of simple neural networks in Python.**
My skills in this area *before* starting the course were...



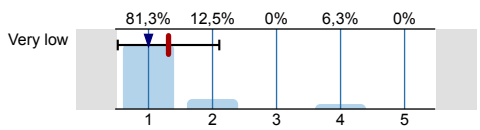
n=16
mw=1,4
md=1
s=0,9

1.29) **I can demonstrate the training process of simple neural networks in Python.**
My skills in this area are *now*...



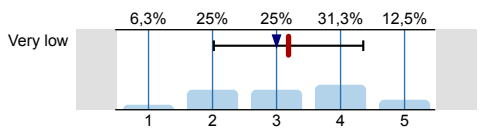
n=16
mw=3,3
md=3,5
s=1,1

1.30) **I can explain the link between convolutional neural networks and cross correlation.**
My skills in this area *before* starting the course were...



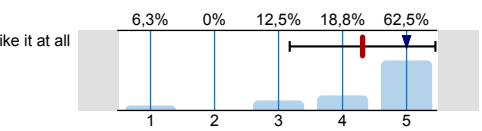
n=16
mw=1,3
md=1
s=0,8

1.31) **I can explain the link between convolutional neural networks and cross correlation.**
My skills in this area are *now*...



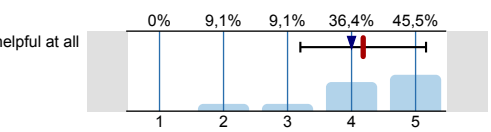
n=16
mw=3,2
md=3
s=1,2

1.32) **Additional question 1:** How do you feel about using Github as a tool in the course?



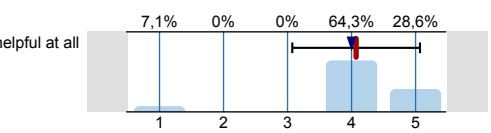
n=16
mw=4,3
md=5
s=1,1

1.33) **Additional question 2:** If you attempted to complete the optional exercises: Were the optional exercises helpful in improving your understanding of the material?



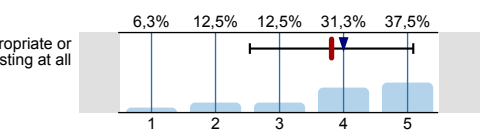
n=11
mw=4,2
md=4
s=1
E.=5

1.34) **Additional question 3:** Was the introduction to the HPC-Cluster helpful?



n=14
mw=4,1
md=4
s=1
E.=2

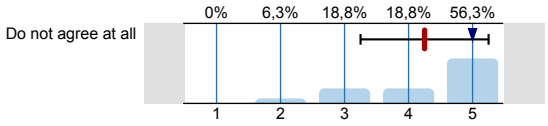
1.35) **Additional question 4:** Were the practical examples in the course appropriate and interesting?



n=16
mw=3,8
md=4
s=1,3

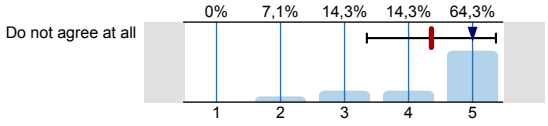
2. Questions about the course (1)

2.1) The course follows a clear structure.



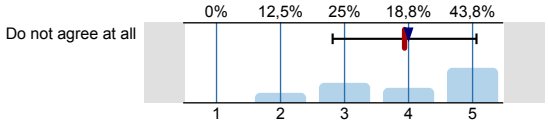
n=16
mw=4,3
md=5
s=1

2.2) The way the course is designed adds to the understanding of the material.



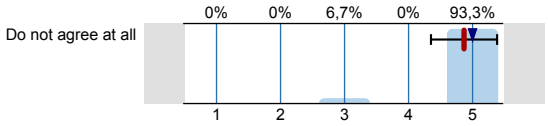
n=14
mw=4,4
md=5
s=1
E.=2

2.3) The course has a good mix of knowledge transfer, interactive elements and discussion.



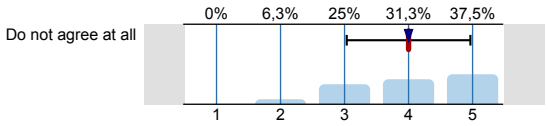
n=16
mw=3,9
md=4
s=1,1

2.4) The instructors are responsive to students' questions and suggestions.



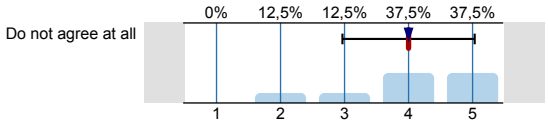
n=15
mw=4,9
md=5
s=0,5

2.5) The instructors clarify the usability and usefulness of the course content.



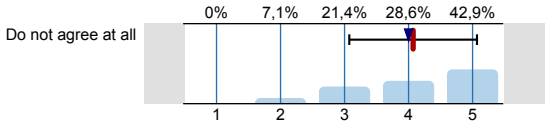
n=16
mw=4
md=4
s=1

2.6) The instructors use good teaching materials (e.g., slides, presentations, bibliography, script) to support the learning process.



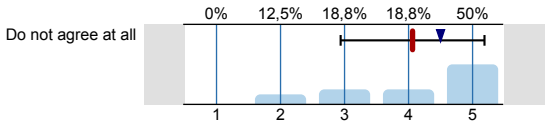
n=16
mw=4
md=4
s=1

2.7) The instructors have good time management skills.



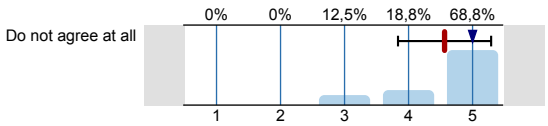
n=14
mw=4,1
md=4
s=1
E.=2

2.8) The instructors express themselves clearly and comprehensively.



n=16
mw=4,1
md=4,5
s=1,1

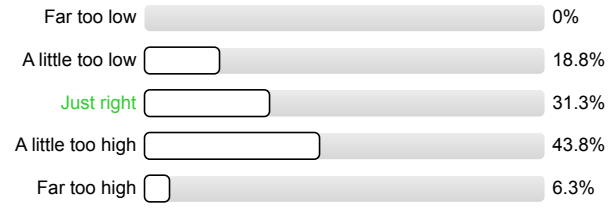
2.9) The instructors encourage active student participation in the course.



n=16
mw=4,6
md=5
s=0,7

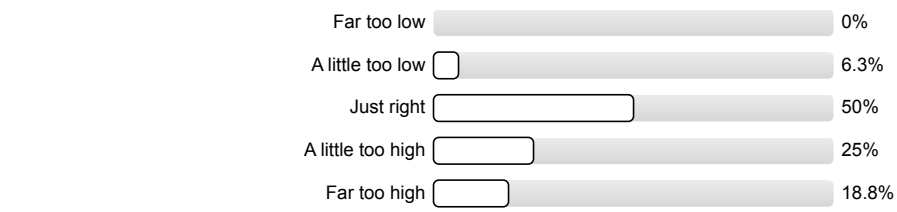
3. Questions about the course (2)

3.1) The difficulty of the lecture part of the course (i.e., theoretical input by instructors) is…

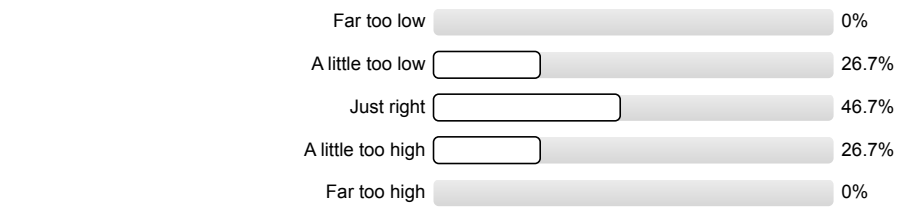


n=16

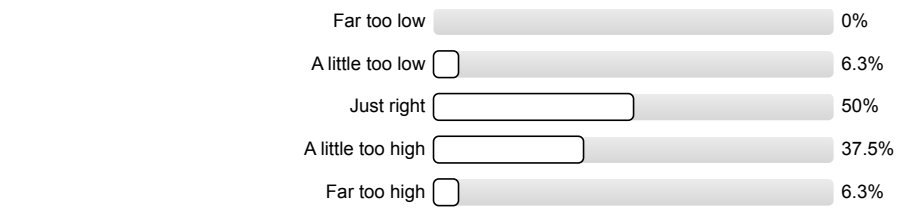
3.2) The difficulty of the exercise part of the course (e.g. programming exercises in python) is…



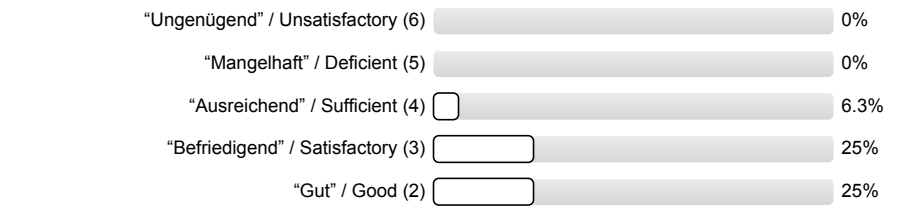
3.3) The scope of the exercises is...



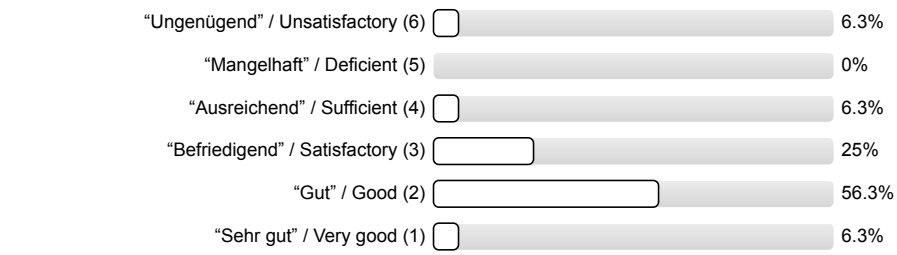
3.4) The pace of the course is…



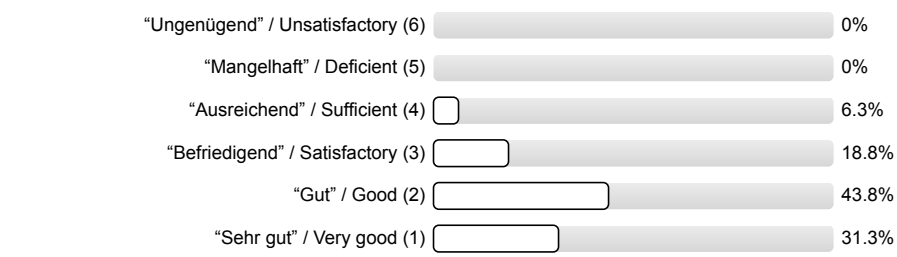
3.5) Overall, I give the course the following school grade:



3.6) Overall, I give the lecture part of the course (i.e., theoretical input by instructors) the following school grade:

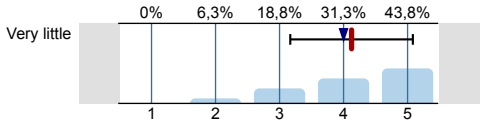


3.7) Overall, I give the exercise part of the course (e.g., programming exercises in python) the following school grade:



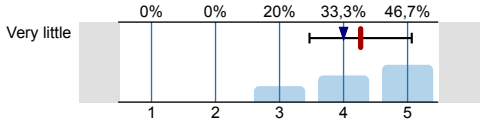
4. Questions about the course (3)

4.1) How much did you learn in this course?



n=16
mw=4,1
md=4
s=1

4.2) How interested were you in the topic ***before*** the course began?



n=15
mw=4,3
md=4
s=0,8
E.=1

5. Participant statistics

5.1) What is your highest educational qualification?

n=16

High school diploma / Baccalaureate / “Abitur”	6.3%
Bachelor (or comparable)	12.5%
Master (or comparable)	68.8%
PhD / “Doctorate”	12.5%
Habilitation / Professorship	0%
None of the above	0%

5.3) How did you find time to take part in this course?

n=15

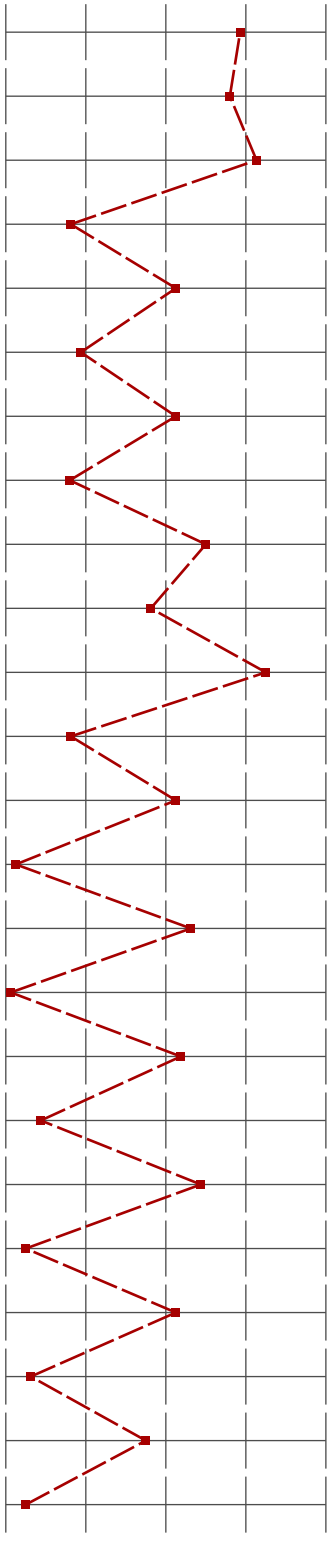
Took personal vacation time / time off work	6.7%
My employer/supervisor let me take the course during my working hours	46.7%
Took educational leave ("Bildungsurlaub")	0%
Took the course in addition to my usual workload (e.g., working in the morning/evening)	20%
Other / a combination of the above	26.7%

5.4) To which gender identity do you most identify?

n=16

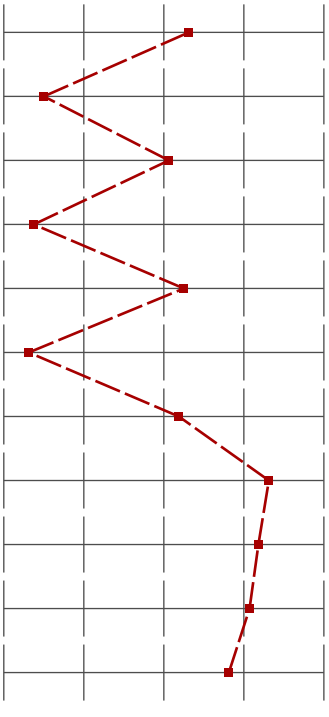
Female	50%
Male	50%
Other / Diverse	0%
Prefer not to answer	0%

1. Evaluation of "Machine Learning Foundations in Python"



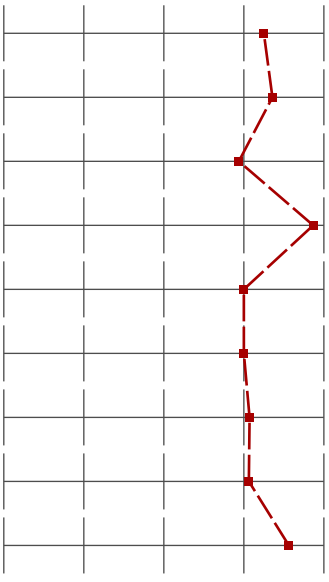
1.1)	The course is useful for conducting my research projects.	Do not agree at all	Fully agree	n=14	mw=3,9	md=4,0	s=0,8
1.2)	I can use what I have learned independently in my research projects.	Do not agree at all	Fully agree	n=15	mw=3,8	md=4,0	s=1,2
1.3)	The amount of examples in the course was appropriate.	Do not agree at all	Fully agree	n=15	mw=4,1	md=4,0	s=1,0
1.4)	**Python programming (in general):** My skills in this area *before* starting the course were...	Very low	Very high	n=16	mw=1,8	md=1,5	s=1,0
1.5)	**Python programming (in general):** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,1	md=3,0	s=0,7
1.6)	**I can use the Linux terminal/console.** My skills in this area *before* starting the course were...	Very low	Very high	n=16	mw=1,9	md=1,0	s=1,3
1.7)	**I can use the Linux terminal/console.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,1	md=3,0	s=1,1
1.8)	**I can explain gradient descent techniques.** My skills in this area *before* starting the course were...	Very low	Very high	n=15	mw=1,8	md=2,0	s=0,9
1.9)	**I can explain gradient descent techniques.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,5	md=4,0	s=1,3
1.10)	**I can calculate descriptive statistics like mean, variance, and distribution in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=2,8	md=3,0	s=1,5
1.11)	**I can calculate descriptive statistics like mean, variance, and distribution in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=4,3	md=4,5	s=0,9
1.12)	**I can explain the concept of Eigenvalues and their importance for PCA.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,8	md=1,5	s=1,1
1.13)	**I can explain the concept of Eigenvalues and their importance for PCA.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,1	md=3,0	s=1,1
1.14)	**I can demonstrate how k-nearest neighbors algorithms work in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,1	md=1,0	s=0,3
1.15)	**I can demonstrate how k-nearest neighbors algorithms work in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,3	md=3,5	s=0,9
1.16)	**I can demonstrate how support vector machine algorithms work in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,1	md=1,0	s=0,3
1.17)	**I can demonstrate how support vector machine algorithms work in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,2	md=3,0	s=1,0
1.18)	**I can demonstrate how decision tree and random forest algorithms work in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,4	md=1,0	s=0,9
1.19)	**I can demonstrate how decision tree and random forest algorithms work in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,4	md=4,0	s=1,0
1.20)	**I can demonstrate how k-means algorithms work in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,3	md=1,0	s=0,8
1.21)	**I can demonstrate how k-means algorithms work in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,1	md=3,0	s=1,0
1.22)	**I can explain the concept of Gaussian mixture models.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,3	md=1,0	s=0,7
1.23)	**I can explain the concept of Gaussian mixture models.** My skills in this area are *now*...	Very low	Very high	n=16	mw=2,8	md=3,0	s=1,1
1.24)	**I can use PCA for dimensionality reduction in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,3	md=1,0	s=0,6

1.25)	**I can use PCA for dimensionality reduction in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,3	md=3,0	s=0,9
1.26)	**I can explain the concepts of feedforward neural networks and convolutional neural networks.**	Very low	Very high	n=16	mw=1,5	md=1,0	s=0,8
1.27)	**I can explain the concept of feedforward neural networks and convolutional neural networks.**	Very low	Very high	n=16	mw=3,1	md=3,0	s=1,1
1.28)	**I can demonstrate the training process of simple neural networks in Python.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,4	md=1,0	s=0,9
1.29)	**I can demonstrate the training process of simple neural networks in Python.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,3	md=3,5	s=1,1
1.30)	**I can explain the link between convolutional neural networks and cross correlation.** My skills in this area *before* starting the course	Very low	Very high	n=16	mw=1,3	md=1,0	s=0,8
1.31)	**I can explain the link between convolutional neural networks and cross correlation.** My skills in this area are *now*...	Very low	Very high	n=16	mw=3,2	md=3,0	s=1,2
1.32)	**Additional question 1:** How do you feel about using Github as a tool in the course?	Did not like it at all	Liked it very much	n=16	mw=4,3	md=5,0	s=1,1
1.33)	**Additional question 2:** If you attempted to complete the optional exercises: Were the optional exercises helpful in improving your	Not helpful at all	Extremely helpful	n=11	mw=4,2	md=4,0	s=1,0
1.34)	**Additional question 3:** Was the introduction to the HPC-Cluster helpful?	Not helpful at all	Extremely helpful	n=14	mw=4,1	md=4,0	s=1,0
1.35)	**Additional question 4:** Were the practical examples in the course appropriate and interesting?	Not appropriate or interesting at all	Very appropriate and interesting	n=16	mw=3,8	md=4,0	s=1,3



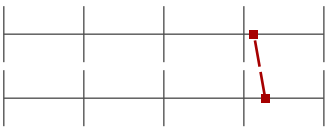
2. Questions about the course (1)

2.1)	The course follows a clear structure.	Do not agree at all	Fully agree	n=16	mw=4,3	md=5,0	s=1,0
2.2)	The way the course is designed adds to the understanding of the material.	Do not agree at all	Fully agree	n=14	mw=4,4	md=5,0	s=1,0
2.3)	The course has a good mix of knowledge transfer, interactive elements and discussion.	Do not agree at all	Fully agree	n=16	mw=3,9	md=4,0	s=1,1
2.4)	The instructors are responsive to students' questions and suggestions.	Do not agree at all	Fully agree	n=15	mw=4,9	md=5,0	s=0,5
2.5)	The instructors clarify the usability and usefulness of the course content.	Do not agree at all	Fully agree	n=16	mw=4,0	md=4,0	s=1,0
2.6)	The instructors use good teaching materials (e. g., slides, presentations, bibliography, script) to support the learning process.	Do not agree at all	Fully agree	n=16	mw=4,0	md=4,0	s=1,0
2.7)	The instructors have good time management skills.	Do not agree at all	Fully agree	n=14	mw=4,1	md=4,0	s=1,0
2.8)	The instructors express themselves clearly and comprehensively.	Do not agree at all	Fully agree	n=16	mw=4,1	md=4,5	s=1,1
2.9)	The instructors encourage active student participation in the course.	Do not agree at all	Fully agree	n=16	mw=4,6	md=5,0	s=0,7



4. Questions about the course (3)

4.1)	How much did you learn in this course?	Very little	Very much	n=16	mw=4,1	md=4,0	s=1,0
4.2)	How interested were you in the topic ***before*** the course began?	Very little	Very much	n=15	mw=4,3	md=4,0	s=0,8



Auswertungsteil der offenen Fragen

1. Evaluation of "Machine Learning Foundations in Python"

1.36) If you thought that some of the examples were inappropriate or boring: Please state which examples could be improved or changed.

- I have no comments on that.
- Sometimes the examples could have been introduced a little better. It was sometimes a little hard to get where in „real life“ this would play a role. This was better in the last week of the course
- The course was great, but still so advanced for those, without a mathematical background
- The examples illustrates general ideas and how to use open source popular python libraries, but they don't give at all understanding of the each small process in neural networks.
  In my opinion, it would be better for understanding to have at least one day to create the neural network from scratch without any library with detailed descriptions of each step.
  Besides from the lectures the process of choosing NN architecture, NN layers and layer parameters is absolutely unclear. I think it is necessary to provide description of this process on some example. For instance we had a CNN exercise on day 12. It is absolutely unclear how to add Conv layers to the network from day 11.

  So, shortly: the course needs at least one exercise with creating NN from scratch and one exercise or example for illustrating the actual process on choosing layers/parameters/starting architecture.
- There's particular focus on images. To improve the experience of other students, it would be helpful if in future we have have variety of projects to work on, besides just images and classification.

  It would also be great to focus on practical data examples rather than implementing theoretical concepts in code, because most students taking this class are interested in scaling up their analytics skills and use cases e.g., their research projects.

4. Questions about the course (3)

4.3) What did you like most about the course?

- I learned the basics of Python programming. I can scale these skills going forward and hopefully, complete my first project in Python
- I liked the idea of learning by doing from the exercise of the course. As the lectures were often filled with long equations, which did not quite help overall, however it helped in other ways i.e it pushed to learn by making mistakes. i think would be much helpful in future if the course material is more interpretable and visualisable.
- I liked the overall course structure and specially the hands on part and coding. I liked the enthusiastic approach of the lecturers and the highly helpful tutors. The friendly and engaging environment was exceptional. I enjoyed throughout and would love to do the course with the same people (e.g: teachers and tutors). Overall they did a great job.
- I really like the variety of exercises and applications we got to see and also the amount of actual training of ML algorithms and neural networks and getting to see the results. Programming in general has this thing where I need to puzzle over something and can try different ways solving a problem which makes it really rewarding for me once the programm is running and producing good results. The course enabled creativity and was in general very open (I think this was my favourite aspect). With programming, when I thought my way into a problem, it sometimes isn't plannable how much time finding the solution takes, and the course structure was very supportive here; whether it was that I could start the lunchbreak later or earlier and be able to head home a bit sooner if I had finished also the optional tasks fast enough. I liked it too, that it was possible, to finish up tasks from the day before.
- Interactive exercises. By doing them individually with the many tutors, I got to understand the parts, that I had difficulties with.
- Introduction into theories and methods of ML
- It was intense, but I learned a lot. I liked that we had a lot of exercises. And the instructors encouraged us to ask questions and to activly participate in the course. It had a very nice atmosphere.
- It was nice to get a broad overview about machine learning. The tutors were very helpful and answered every question we had. I dont think I am an expert now or can apply the methods on my own, but I know what could be possible. Also the introduction into the cluster was very helpful and might be useful gor me in the future.
- It was very helpful to get the theoretical introduction and later work on the content by myself during the exercises, this was essential for better understanding

  Very enthusiastic, patient and helpful tutors and friendly and productive atmosphere

  That we got very useful background knowledge regarding python
- The exercises, and the accessibility of the instructors and tutors. There was (almost) always somebody available to answer any questions I might have, and I have learned a lot from hands-on experience under their instruction.
  Moritz Wolter is particularly good at explaining very complex things, which I would never have understood without him.

- The lecturers were very responsive and helpful. The slides has a lot of explanations, so they can easily be used as guide even without the teacher (if you missed the lecture, for instance).
- hands-on-experience, tips&tricks / optimizations in coding
  tangible examples
- steep learning curve, a lot of tutors, nice people, great opportunity to learn totally new stuff, access on bender, I learned A LOT

4.4) What could be improved about this course?

- I think it would be very helpful if the course could be stacked after one week python programming which might make the teaching path smoother for people who is not so much familiar with computational coding (for e.g biologist) and would make this course much more enjoyable for everyone. In that situtation the whole block course could be completed in 4 weeks.
  also for the theoritical part of the course, i think the tutors could start from basics so that people from other backgrounds can also follow smoothly.
- Nothing I can think of at the moment
- Perhaps the course material could be a little more descriptive for people with no background.
- Projects. A mix of images (Nueroscience, computer vision, etc) and other real projects from other life and natural science domains!
- The jax library used sometimes lacked a bit in terms of documentation, at least for my taste. Sometimes it felt a bit hard trying to find out what tools I even got at hand to solve the tasks and what inputs they require. On the other hand, fiddling my way into understanding all these things helped me in general to get a good overview over the problems and concepts and there were always people around I could ask. So this is slightly a question of taste. It worked the way it was :)
- The math was very hard for me. I would have needed more time to understand it fully, or more previous knowledge. Maybe, additionally to having python skills beforhand, it should be indicated what level of math is needed.
- The provided python scrips should have been commented better. Sometimes it was difficult to understand what was given and how we had to add out code.
  For me, it was sometimes difficult to understand the topics with just the 1-1.5h lecture. Complex topics were introduced shortly and than we directly had to use them in our codes. That was a bit too fast. I had to ask the tutors a lot to understand the basic concept. That took me a lot of time and sometimes was frustrating.
  Would it be possible to have an one week python course before?
- The way how the exercises were constructed I don't like. It is often not understandable how in detail it work, and in exercises there was no example answer, so sometimes you have no idea: did you finish the task or not.
  But when you finally finish the task, it illustrates the idea good.
- There were some inconsistencies in mathematical terminology (on the slides and between slides and exercises) that were a bit confusing

  Some of the content was presented pretty fast, so it was hard to follow sometimes

  I liked all the exercises except the one where we applied PCA to image data, I think there could have been used a somewhat more realistic application case as example
- To add simple examples (maybe even visual) in lectures when algorithms are discussed, to fix some errors in the practical tasks.
- more time
  more explanations, more documentation
  more description of functions/classes
  more visualisations of abstract models
  more mindfulness about lacking mathematical education of participants in contrast to complexity of tasks and models
- the math could be simpler and the intuition behind the algorithms could be better explained
- too little explanation for me to follow
  it was really hard
  I had a lot of trouble understanding

5. Participant statistics

5.2) What is your main field of research?

- Agriculture/Genetics
- Astrophysics
- Clinical and Population Sciences
- Cognitive LInguistics
- Dentistry

- History
- Neuroscience (6 Nennungen)
- Physics

5.5) What is your age (in years)?

- 23
- 26 (2 Nennungen)
- 27
- 28 (2 Nennungen)
- 29 (2 Nennungen)
- 31
- 33 (2 Nennungen)
- 36
- 38