

## **Course Summary for *Programming for Applications in Geomatics, Physical Geography and Ecosystem Science*, NGEN20 HT 2022.**

**Course coordinator:** Per-Ola Olsson

**Teachers in the course:** Per-Ola Olsson, Mitch Selander, David Tenenbaum (GIS project), Rachid Oucheikh.

**Number of students:** 36 registered students

**Grade distribution:** 3 UK\*, 8 G, 25 VG.

\*Two of the students with grade = UK have only smaller parts to complete (2023-02-15) and plan to finalize the course. One student has been absent most of the time and might not finish the course. Grade is 50% exam and 50% GIS-project.

### **Evaluation**

#### **Summary of the course evaluation**

Number of survey responses: 24 which is 67 % of the students

In general, the students were very satisfied with the course (overall score of 4.3, on a scale 1-5) with a grade of 4.4 for the Python part of the course and 4.0 for the GIS project. The students were mostly happy with the feedback and work from teachers as well as with the course materials. Some students thought the GIS project was demanding and felt it was challenging to get started since they had no or little experience in working with ArcGIS Pro and wished for some general introduction to ArcGIS during the first part of the course where they learn Python programming.

#### **Comments from the teaching team**

This was the second time the course was given in the new format with 5 weeks of Python programming (no Matlab module) followed by a 4-week GIS project. It was also the first time the course was given to students at the new master program in GIS and remote sensing which resulted in two differences compared to earlier: (1) there were twice as many students as usual (2<sup>nd</sup> year old geomatics master and 1<sup>st</sup> year new GIS and remote sensing master) and (2) the students starting the new GIS and remote sensing master did not have at least 30hp GIS as the previous students on the geomatics master. The larger number of students was handled by splitting the class into two groups that had all scheduled sessions in parallel and that worked fine. The lower GIS prerequisite was a problem for some of the students and that is something we will address the next time the course is given.

However, the overall grade of the course was higher than last year when the course was given in the new format for the first time.

**Evaluation of changes implemented since the last time the course was given** The main difference from the previous year was that we had a larger number of additional exercises to work on as training for students that are good at programming when they have finished the mandatory exercises – some know programming already when they start the course. Many students were working on the additional exercises and there were also more questions about the additional exercises than earlier so the extra training was popular.

**Suggestions for changes to implement before the course is given the next time** One issue with the course is that there is a very large difference in knowledge among the students. Some know programming already when they start the course and some are completely new to programming. And some learn programming fast while some struggle to get into the thinking that is needed for programming; that is a common problem with programming courses. Even though we had created more additional exercises for this year there were still students that were asking for more extra exercises. We will provide even more exercises until the course is given next year. One suggestion from students this year was to have scheduled sessions to discuss solutions to exercises orally in addition to give personal feedback (both orally during exercises and extensive written to submissions). This is a good suggestion and we will try to schedule a few exercises to have larger discussions in groups about how to solve the exercises.

Another issue is that the students on the new GIS and remote sensing master takes NGEN20 as the first course and some students have no experience in working with ArcGIS Pro which is used during the final GIS-project in the course. The number of students with no prior ArcGIS training is likely to vary from year to year. To help the students that haven't worked with ArcGIS we will add opportunities to get ArcGIS Pro training before the project starts. This can be done in two ways: (1) providing introduction to ArcGIS Pro exercises that the students can work on during the course e.g. instead of the additional Python training exercises or (2) a short online introduction to ArcGIS Pro that the students can take before the course starts. Even if the students have taken GIS-courses (15hp prerequisite) they might have used other software than ArcGIS Pro.

2023-02-17, this summary was done by Per-Ola Olsson

# NGEN20 2022

Answer Count: 24

## Part I: The course in general

(If not indicated in another way: 1= not at all, 5=very well)

Do you think that the aim, as described below, has been reached well in this course?

The course aim is that the student, on completion of the course, should have acquired knowledge and proficiencies to handle the programming language Python to solve problems and tasks in geographic information sciences (GIS) and remote sensing as well as for applications in physical geography and ecosystem sciences.

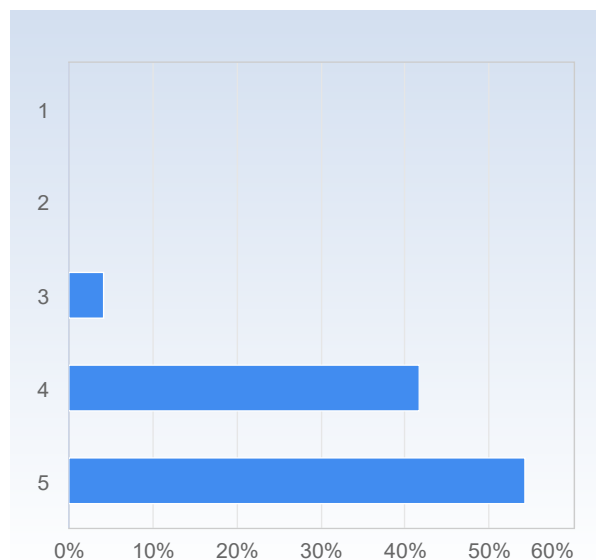
The course content is largely practically oriented to give training in problem-solving, and in how problems can be structured to be solved with programming tools. An overall goal is also to increase the employability of graduates, in both public and private sectors, and for activities in research.

1 - has not been reached at all, 5 - has been fully reached

Do you think that the aim, as described below, has been reached well in this course?

1 - has not been reached at all, 5 - has been fully reached

	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (4,2%)
4	10 (41,7%)
5	13 (54,2%)
Total	24 (100,0%)

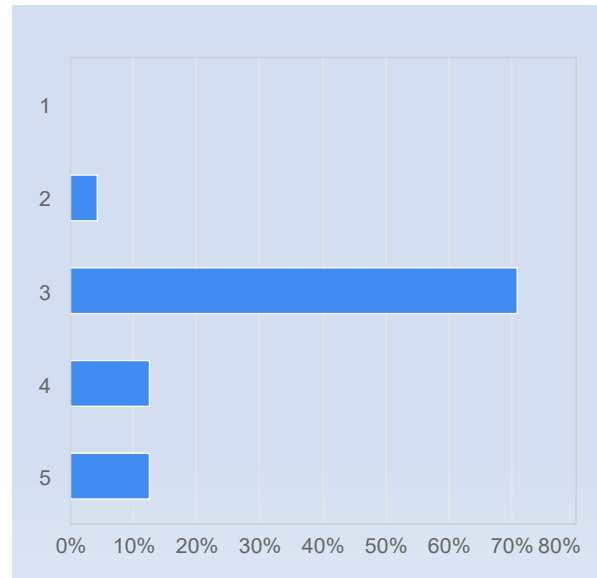


	Mean	Standard Deviation
Do you think that the aim, as described below, has been reached well in this course?	4,5	0,6
1 - has not been reached at all, 5 - has been fully reached		

## How was the workload of the course? (1=too low, 3= OK, 5= too much work)

How was the workload of the course? (1=too low, 3= OK, 5= too much work)

	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	17 (70,8%)
4	3 (12,5%)
5	3 (12,5%)
Total	24 (100,0%)

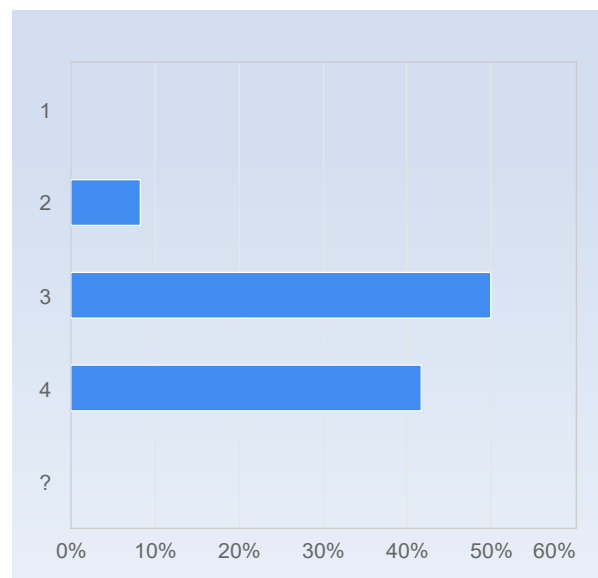


	Mean	Standard Deviation
How was the workload of the course? (1=too low, 3= OK, 5= too much work)	3,3	0,8

## Was the course as you expected (1=No, not at all, 2=No, not really, 3=yes, partly, 4=Yes, completely, ?= do not know)

Was the course as you expected (1=No, not at all, 2=No, not really, 3=yes, partly, 4=Yes, completely, ?= do not know)

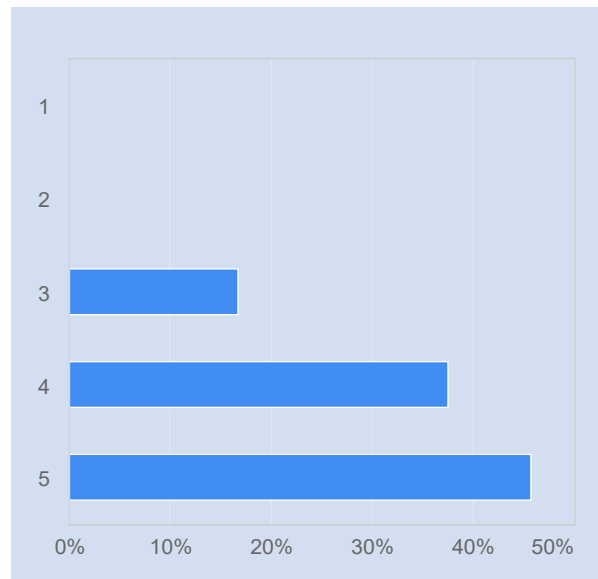
	Number of responses
1	0 (0,0%)
2	2 (8,3%)
3	12 (50,0%)
4	10 (41,7%)
?	0 (0,0%)
Total	24 (100,0%)



	Mean	Standard Deviation
Was the course as you expected (1=No, not at all, 2=No, not really, 3=yes, partly, 4=Yes, completely, ?= do not know)	3,3	0,6

## How do you grade the course as a whole? (1=very bad, 5= very good)

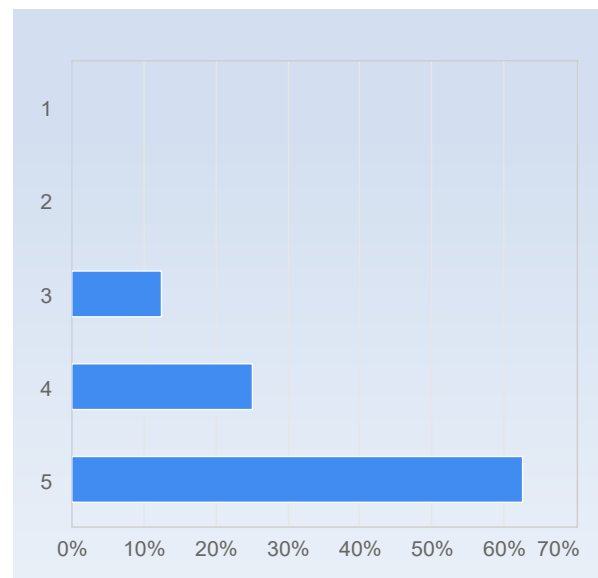
How do you grade the course as a whole? (1=very bad, 5= very good)	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	4 (16,7%)
4	9 (37,5%)
5	11 (45,8%)
Total	24 (100,0%)



	Mean	Standard Deviation
How do you grade the course as a whole? (1=very bad, 5= very good)	4,3	0,8

## Does the course content and work load corresponds to the course credits (1= No, not at all, 5= yes, entirely)

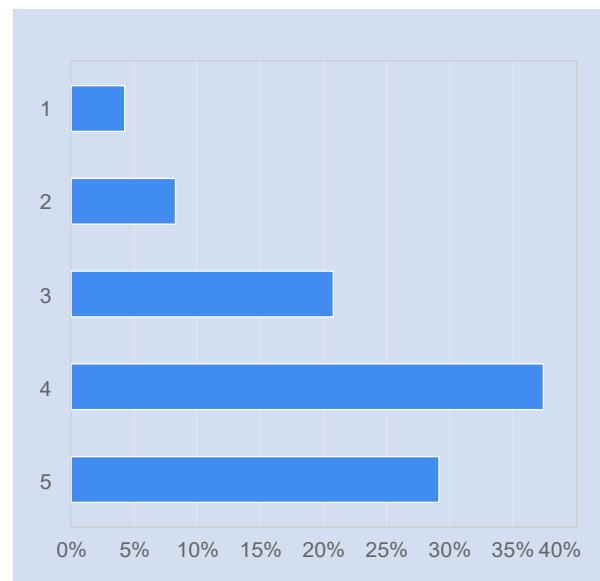
Does the course content and work load corresponds to the course credits (1= No, not at all, 5= yes, entirely)	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	3 (12,5%)
4	6 (25,0%)
5	15 (62,5%)
Total	24 (100,0%)



	Mean	Standard Deviation
Does the course content and work load corresponds to the course credits (1= No, not at all, 5= yes, entirely)	4,5	0,7

## Did the teachers motivate you and inspire you ? (1=no, not at all, 5= yes, very much)

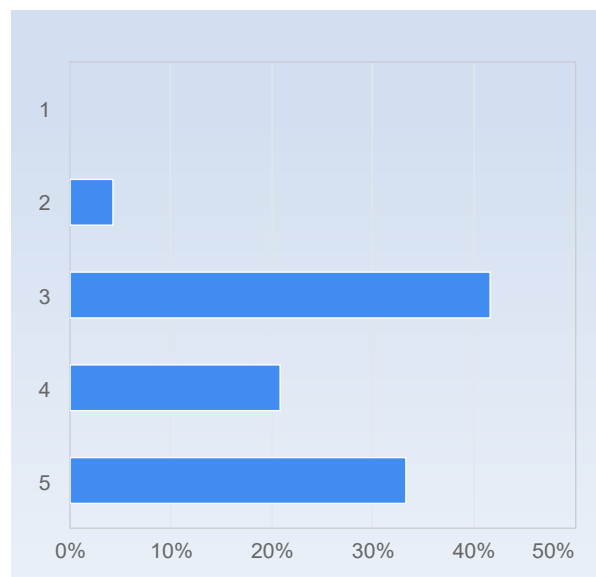
Did the teachers motivate you and inspire you ? (1=no, not at all, 5= yes, very much)	Number of responses
1	1 (4,2%)
2	2 (8,3%)
3	5 (20,8%)
4	9 (37,5%)
5	7 (29,2%)
<b>Total</b>	<b>24 (100,0%)</b>



	Mean	Standard Deviation
Did the teachers motivate you and inspire you ? (1=no, not at all, 5= yes, very much)	3,8	1,1

## Did you get enough training in communication, both oral and written? (1=No, not at all, 5= Yes, completely)

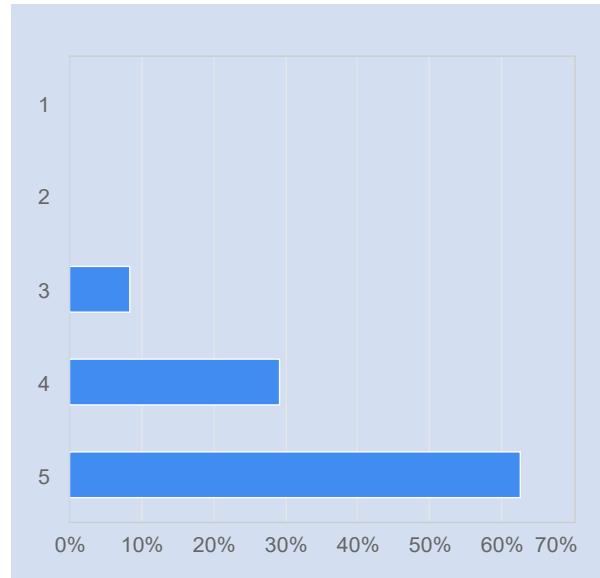
Did you get enough training in communication, both oral and written? (1=No, not at all, 5= Yes, completely)	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	10 (41,7%)
4	5 (20,8%)
5	8 (33,3%)
<b>Total</b>	<b>24 (100,0%)</b>



	Mean	Standard Deviation
Did you get enough training in communication, both oral and written? (1=No, not at all, 5= Yes, completely)	3,8	1,0

## Did you get useful feedback on your work and help to understand difficult material during the course? Help during work, answers on questions, useful comments on hand-ins (1=not at all, 5= completely)

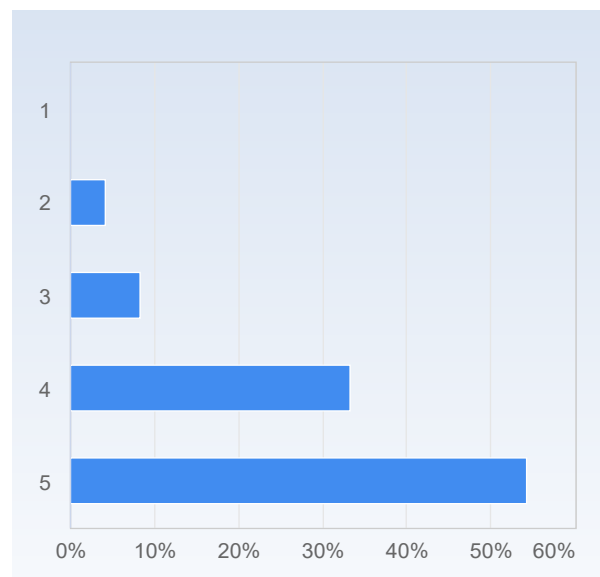
Did you get useful feedback on your work and help to understand difficult material during the course? Help during work, answers on questions, useful comments on hand-ins (1=not at all, 5= completely)	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	2 (8,3%)
4	7 (29,2%)
5	15 (62,5%)
Total	24 (100,0%)



Did you get useful feedback on your work and help to understand difficult material during the course? Help during work, answers on questions, useful comments on hand-ins (1=not at all, 5= completely)	Mean	Standard Deviation
	4,5	0,7

## How was the practical arrangement of the course: schedule, course page information, lecture rooms, computer labs etc? (1=very bad, 5= very good)

How was the practical arrangement of the course: schedule, course page information, lecture rooms, computer labs etc? (1=very bad, 5= very good)	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	2 (8,3%)
4	8 (33,3%)
5	13 (54,2%)
Total	24 (100,0%)



How was the practical arrangement of the course: schedule, course page information, lecture rooms, computer labs etc? (1=very bad, 5= very good)	Mean	Standard Deviation
	4,4	0,8

## Part II: question on course specific elements

(If not indicated in another way: 1= not at all, 5=very well)

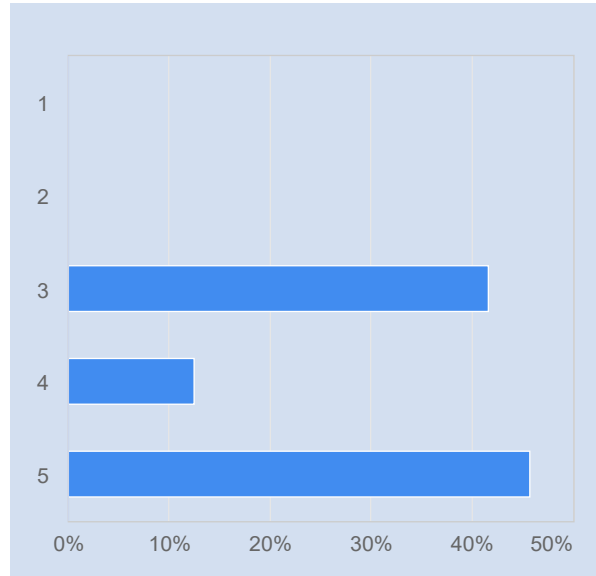
### Introduction to Python part of the course

The questions below apply to the introduction to Python part (not the project) of the course.

How was the course book for the introduction to Python part of the course?

(1=very bad, 3=OK, 5=very good)

How was the course book for the introduction to Python part of the course?	
(1=very bad, 3=OK, 5=very good)	
	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	10 (41,7%)
4	3 (12,5%)
5	11 (45,8%)
Total	24 (100,0%)

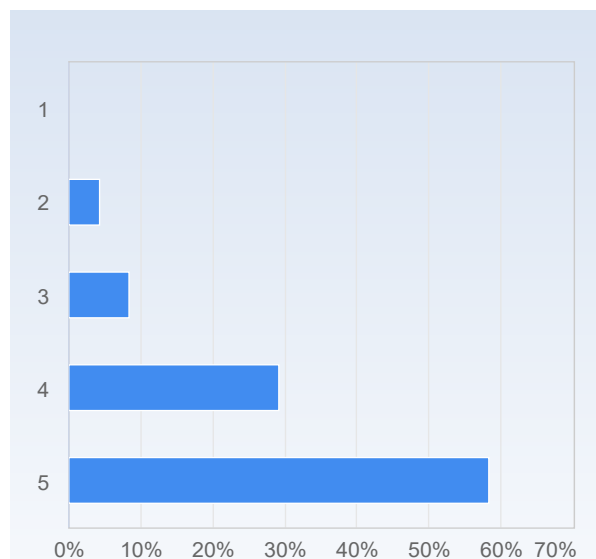


	Mean	Standard Deviation
How was the course book for the introduction to Python part of the course?		
(1=very bad, 3=OK, 5=very good)	4,0	1,0

How was the course material - exercises and lectures - for the introduction to Python part of the course?

(1=very bad, 3=OK, 5=very good)

How was the course material - exercises and lectures - for the introduction to Python part of the course?	
(1=very bad, 3=OK, 5=very good)	
	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	2 (8,3%)
4	7 (29,2%)
5	14 (58,3%)
Total	24 (100,0%)

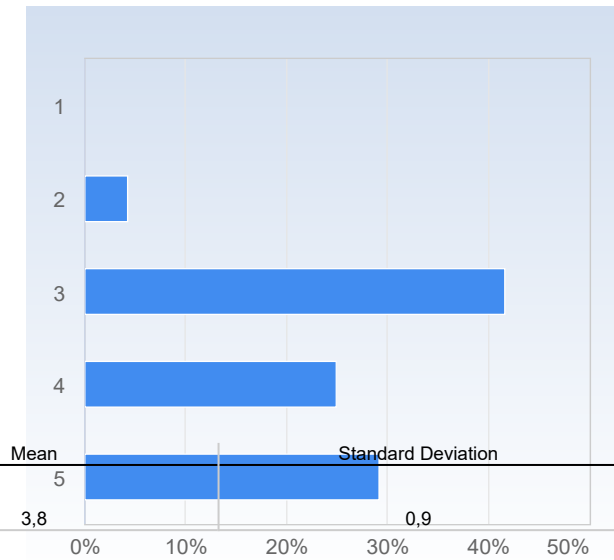


	Mean	Standard Deviation
How was the course material - exercises and lectures - for the introduction to Python part of the course?		
(1=very bad, 3=OK, 5=very good)	4,4	0,8



## How was the workload of the introduction to Python module? (1=too low, 3= OK, 5= too much work)

How was the workload of the introduction to Python module? (1=too low, 3= OK, 5= too much work)	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	10 (41,7%)
4	6 (25,0%)
5	7 (29,2%)
Total	24 (100,0%)

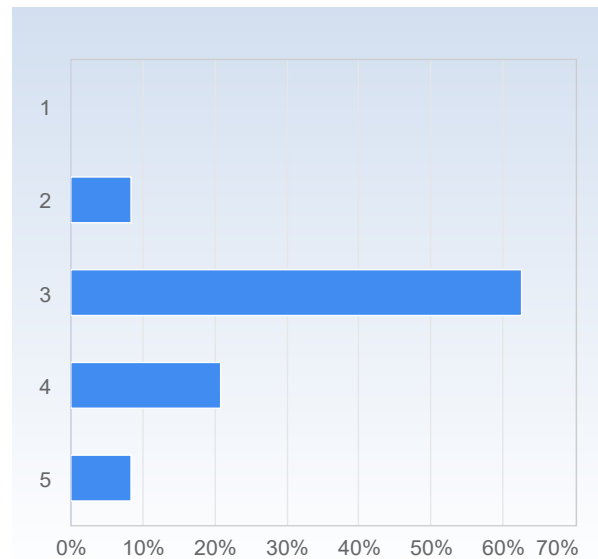


How was the workload of the introduction to Python module?  
(1=too low, 3= OK, 5= too much work)

## How was the difficulty level of the introduction to Python module?

(1=too easy, 3= OK, 5= too difficult)

How was the difficulty level of the introduction to Python module? (1=too easy, 3= OK, 5= too difficult)	Number of responses
1	0 (0,0%)
2	2 (8,3%)
3	15 (62,5%)
4	5 (20,8%)
5	2 (8,3%)
Total	24 (100,0%)

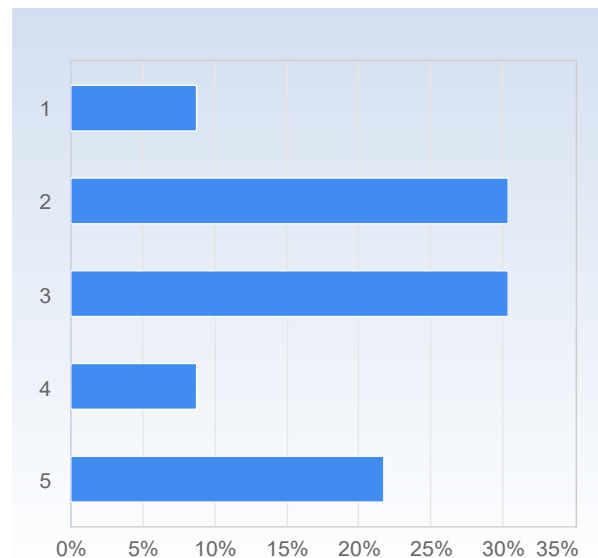


How was the difficulty level of the introduction to Python module? (1=too easy, 3= OK, 5= too difficult)	Mean	Standard Deviation
	3,3	0,8

## How would you rate the Jupyter exercise?

(1=very bad, 5= very good)

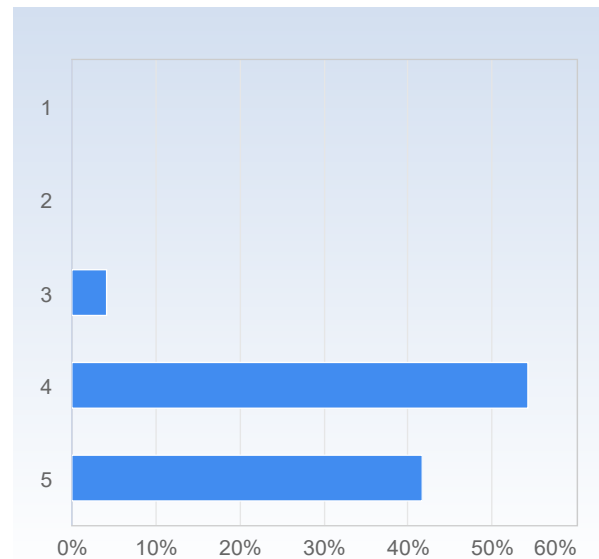
How would you rate the Jupyter exercise? (1=very bad, 5= very good)	Number of responses
1	2 (8,7%)
2	7 (30,4%)
3	7 (30,4%)
4	2 (8,7%)
5	5 (21,7%)
Total	23 (100,0%)



How would you rate the Jupyter exercise? (1=very bad, 5= very good)	Mean	Standard Deviation
	3,0	1,3

## How would you rate the introduction to Python part of the course? (1=very bad, 5= very good)

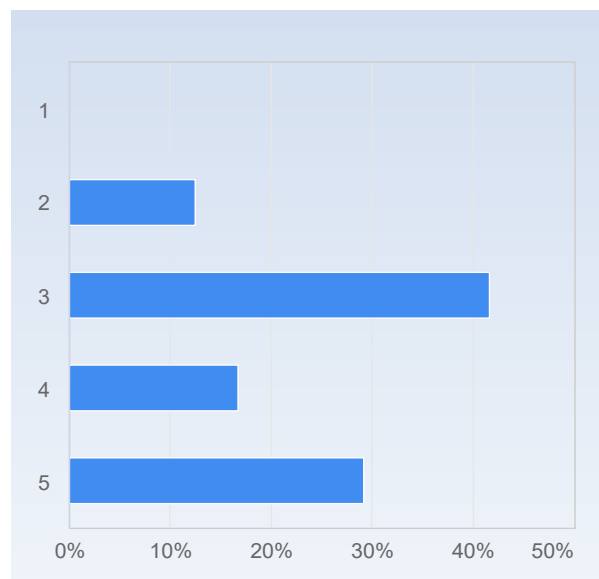
How would you rate the introduction to Python part of the course? (1=very bad, 5= very good)	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	1 (4,2%)
4	13 (54,2%)
5	10 (41,7%)
Total	24 (100,0%)



	Mean	Standard Deviation
How would you rate the introduction to Python part of the course? (1=very bad, 5= very good)	4,4	0,6

## How was the litterature and course material for the GIS project? (1=very bad, 3=OK, 5=very good)

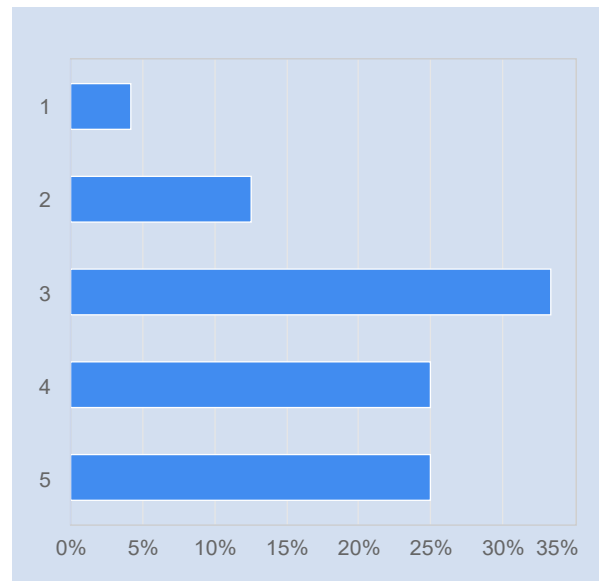
How was the litterature and course material for the GIS project? (1=very bad, 3=OK, 5=very good)	Number of responses
1	0 (0,0%)
2	3 (12,5%)
3	10 (41,7%)
4	4 (16,7%)
5	7 (29,2%)
Total	24 (100,0%)



	Mean	Standard Deviation
How was the litterature and course material for the GIS project? (1=very bad, 3=OK, 5=very good)	3,6	1,1

## Did you feel well prepared for the GIS project? (1=not prepared, 5= fully prepared)

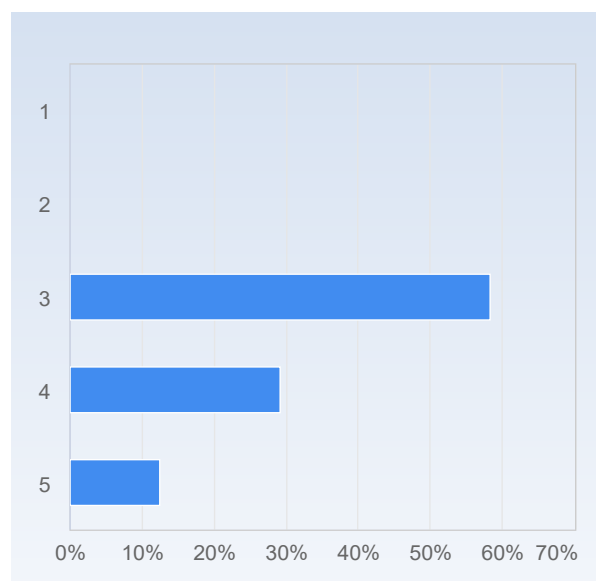
Did you feel well prepared for the GIS project? (1=not prepared, 5= fully prepared)	Number of responses
1	1 (4,2%)
2	3 (12,5%)
3	8 (33,3%)
4	6 (25,0%)
5	6 (25,0%)
Total	24 (100,0%)



Did you feel well prepared for the GIS project? (1=not prepared, 5= fully prepared)	Mean	Standard Deviation
	3,5	1,1

## How was the workload of the GIS project? (1=too low, 3= OK, 5= too much work)

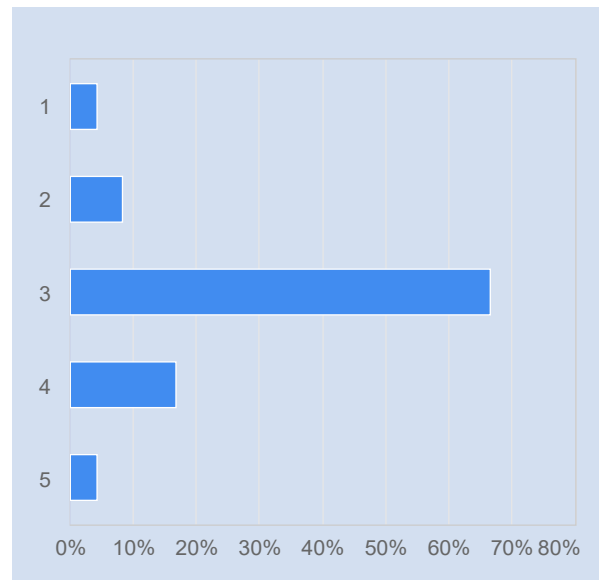
How was the workload of the GIS project? (1=too low, 3= OK, 5= too much work)	Number of responses
1	0 (0,0%)
2	0 (0,0%)
3	14 (58,3%)
4	7 (29,2%)
5	3 (12,5%)
Total	24 (100,0%)



How was the workload of the GIS project? (1=too low, 3= OK, 5= too much work)	Mean	Standard Deviation
	3,5	0,7

## Was the time (4 weeks) sufficient for the project? (1=too short 3= OK, 5= too long)

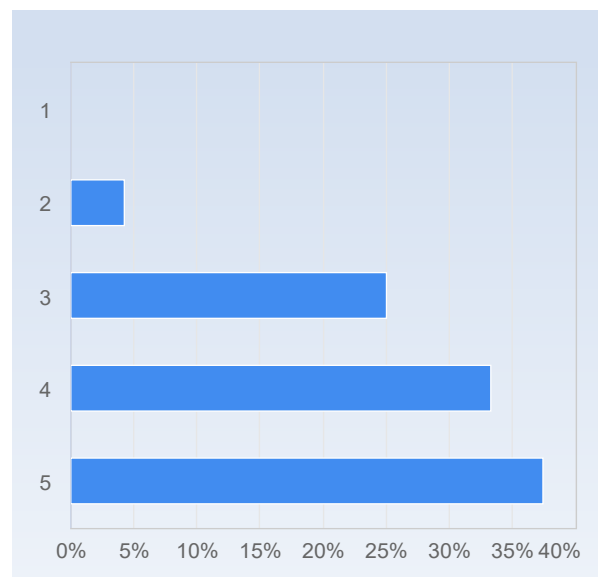
Was the time (4 weeks) sufficient for the project? (1=too short 3= OK, 5= too long)	Number of responses
1	1 (4,2%)
2	2 (8,3%)
3	16 (66,7%)
4	4 (16,7%)
5	1 (4,2%)
Total	24 (100,0%)



	Mean	Standard Deviation
Was the time (4 weeks) sufficient for the project? (1=too short 3= OK, 5= too long)	3,1	0,8

## How would you rate the GIS project? (1=very bad, 5= very good)

How would you rate the GIS project? (1=very bad, 5= very good)	Number of responses
1	0 (0,0%)
2	1 (4,2%)
3	6 (25,0%)
4	8 (33,3%)
5	9 (37,5%)
Total	24 (100,0%)



	Mean	Standard Deviation
How would you rate the GIS project? (1=very bad, 5= very good)	4,0	0,9