



Environmental geochemistry MV0218, 20083.1819

15 Hp

Pace of study = 100%

Education cycle = Advanced -

Course leader = Dan Berggren-Kleja

Evaluation report

Evaluation period: 2019-01-15 - 2019-02-03

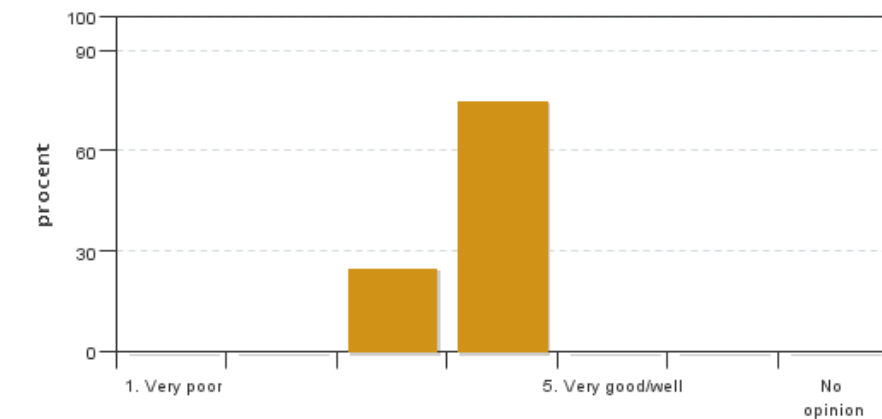
Answers 4

Number of students 19

Answer frequency 21 %

Mandatory standard questions

1. My overall impression of the course is:

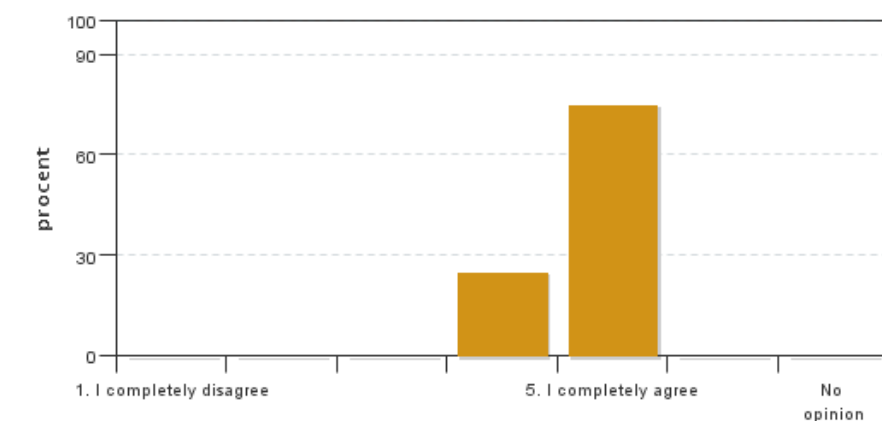


Answers: 4
Medel: 3,8
Median: 4

1: 0
2: 0
3: 1
4: 3
5: 0

No opinion: 0

2. I found the course content to have clear links to the learning objectives of the course.

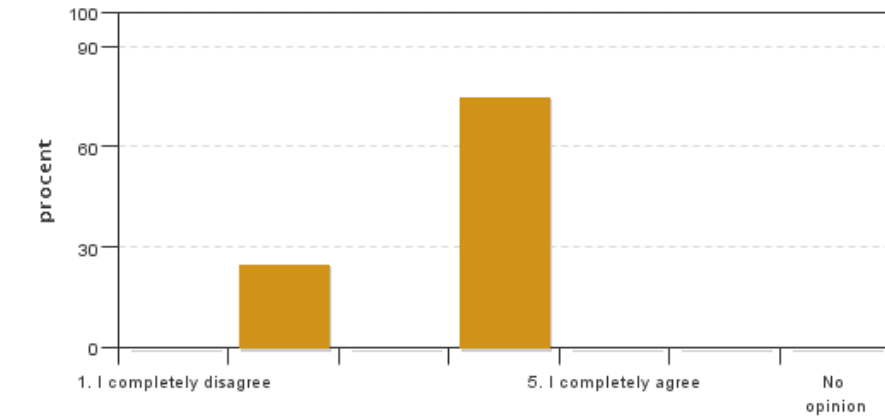


Answers: 4
Medel: 4,8
Median: 5

1: 0
2: 0
3: 0
4: 1
5: 3

No opinion: 0

3. My prior knowledge was sufficient for me to benefit from the course.

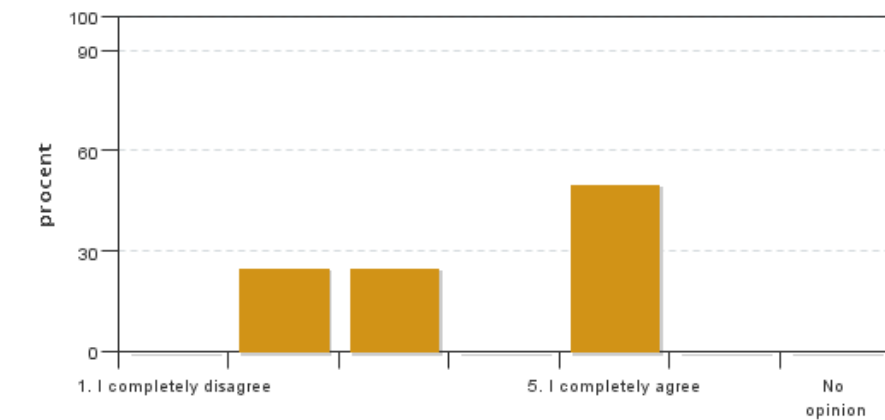


Answers: 4
 Medel: 3,5
 Median: 4

1: 0
 2: 1
 3: 0
 4: 3
 5: 0

No opinion: 0

4. The information about the course was easily accessible.

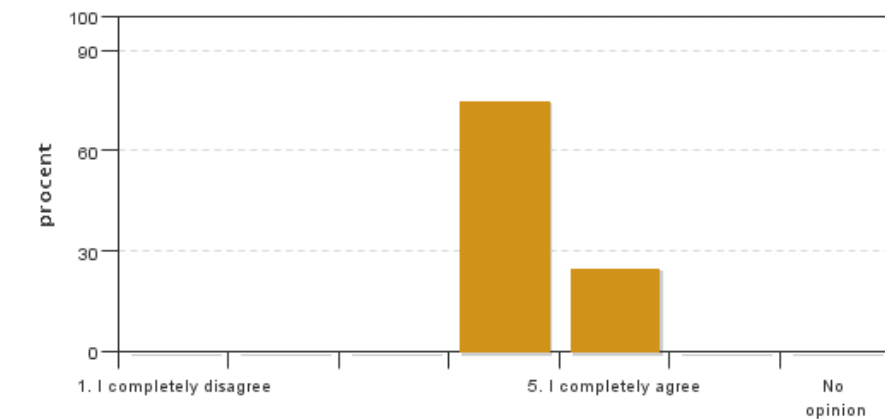


Answers: 4
 Medel: 3,8
 Median: 3

1: 0
 2: 1
 3: 1
 4: 0
 5: 2

No opinion: 0

5. The various course components (lectures, course literature, exercises etc.) have supported my learning.

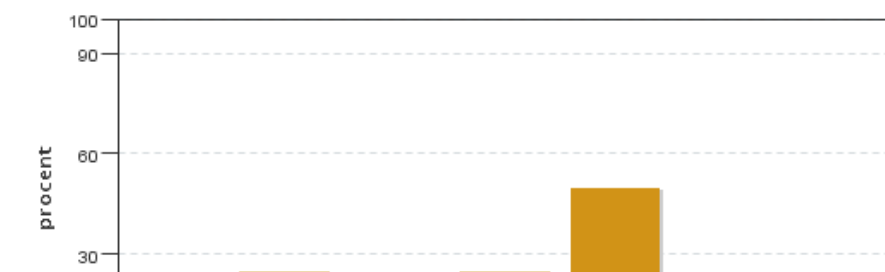


Answers: 4
 Medel: 4,3
 Median: 4

1: 0
 2: 0
 3: 0
 4: 3
 5: 1

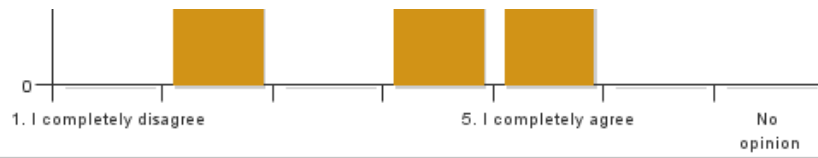
No opinion: 0

6. The social learning environment has been inclusive, respecting differences of opinion.



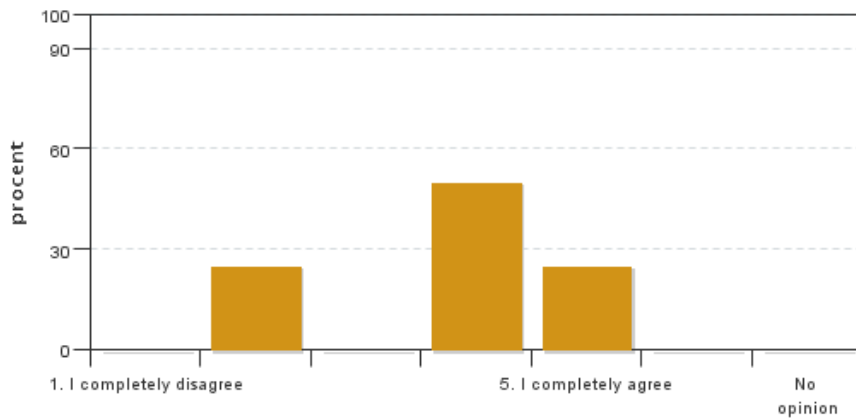
Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 1
 3: 0
 4: 1
 5: 2



No opinion: 0

7. The physical learning environment (facilities, equipment etc.) has been satisfactory.

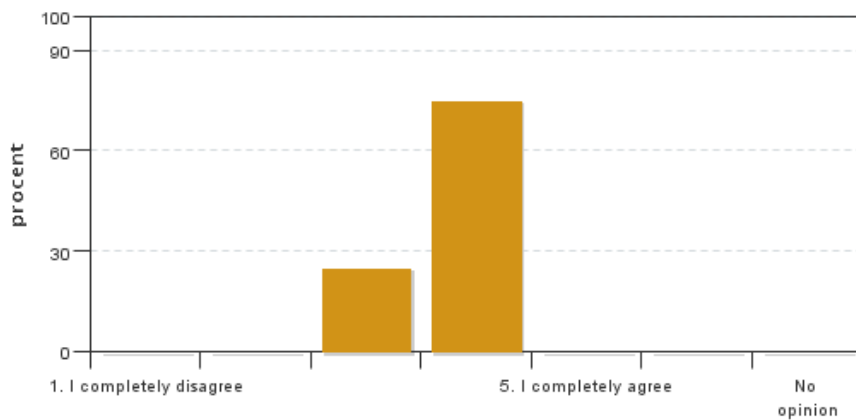


Answers: 4
Medel: 3,8
Median: 4

1: 0
2: 1
3: 0
4: 2
5: 1

No opinion: 0

8. The examination(s) provided opportunity to demonstrate what I had learnt during the course (see the learning objectives).

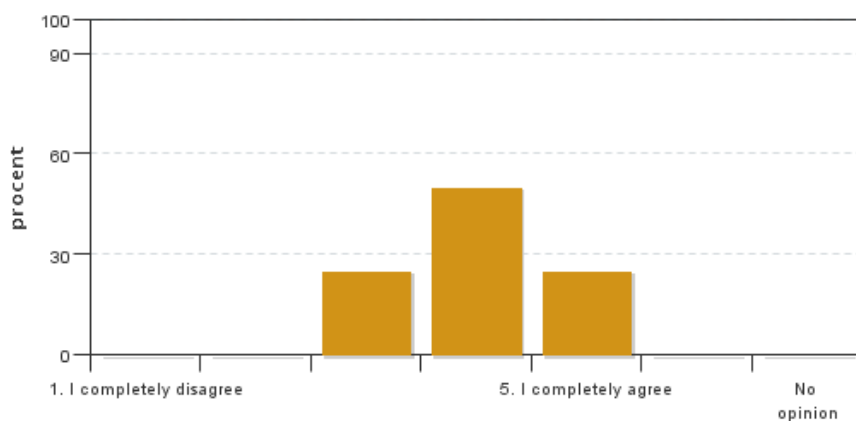


Answers: 4
Medel: 3,8
Median: 4

1: 0
2: 0
3: 1
4: 3
5: 0

No opinion: 0

9. The course covered the sustainable development aspect (environmental, social and/or financial sustainability).

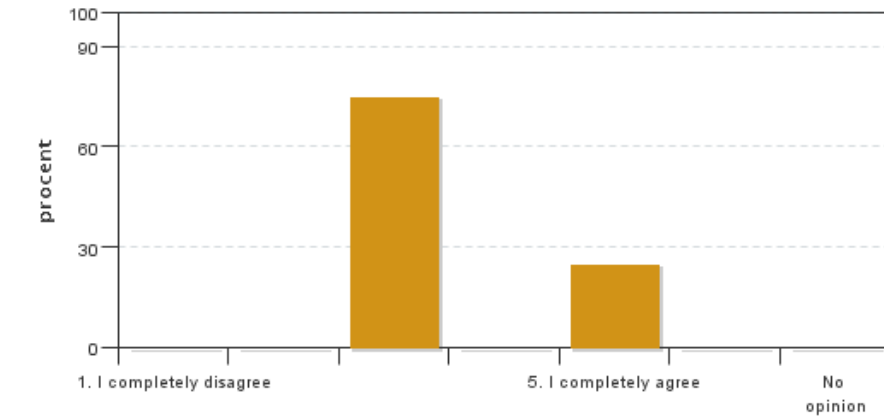


Answers: 4
Medel: 4,0
Median: 4

1: 0
2: 0
3: 1
4: 2
5: 1

No opinion: 0

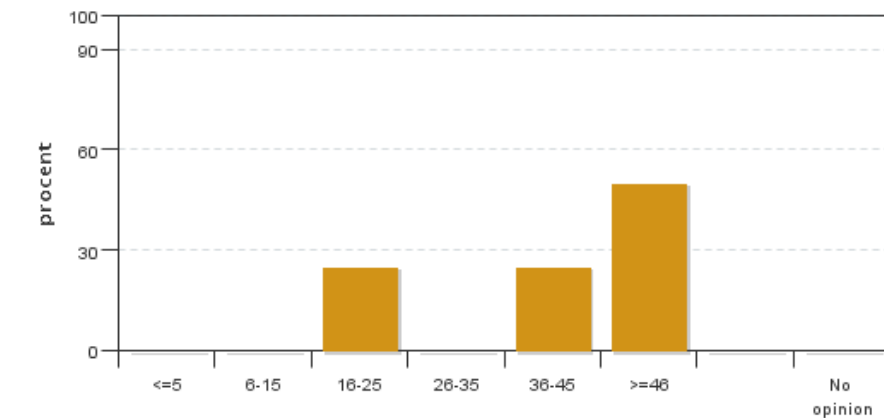
10. The course covered international perspectives.



Answers: 4
 Medel: 3,5
 Median: 3

1: 0
 2: 0
 3: 3
 4: 0
 5: 1
 No opinion: 0

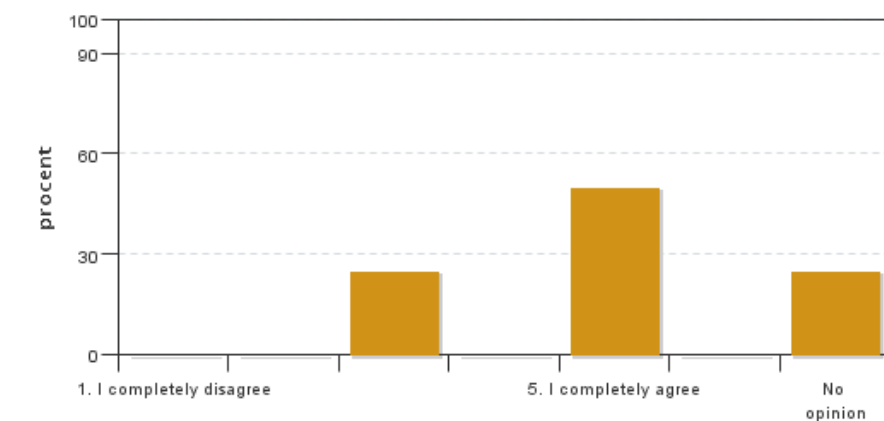
11. On average, I have spent ... hours/week on the course (including timetabled hours).



Answers: 4
 Medel: 38,0
 Median: 36-45

<=5: 0
 6-15: 0
 16-25: 1
 26-35: 0
 36-45: 1
 >=48: 2
 No opinion: 0

12. I believe the course has included a gender and equality aspect, regarding content as well as teaching practices (e.g. perspective on the subject, reading list, allocation of speaking time and the use of master suppression techniques).

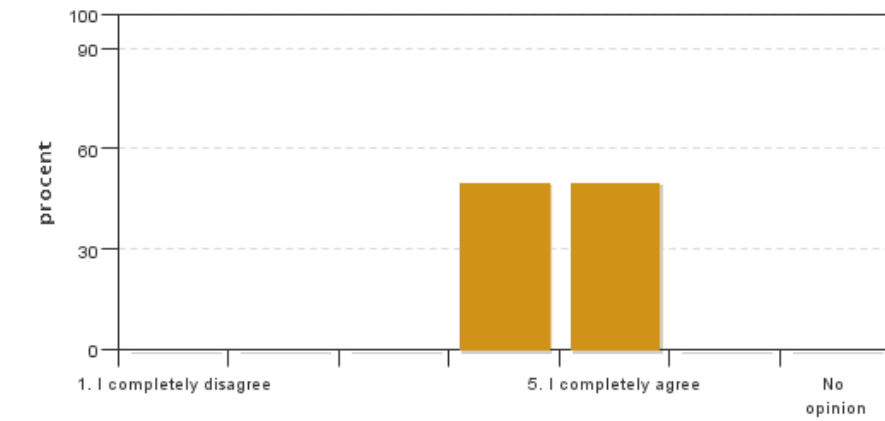


Answers: 4
 Medel: 4,3
 Median: 5

1: 0
 2: 0
 3: 1
 4: 0
 5: 2
 No opinion: 1

Additional own questions

13. Soil minerals, lectures and Lab. 1 (VK) – valuable part of the course?

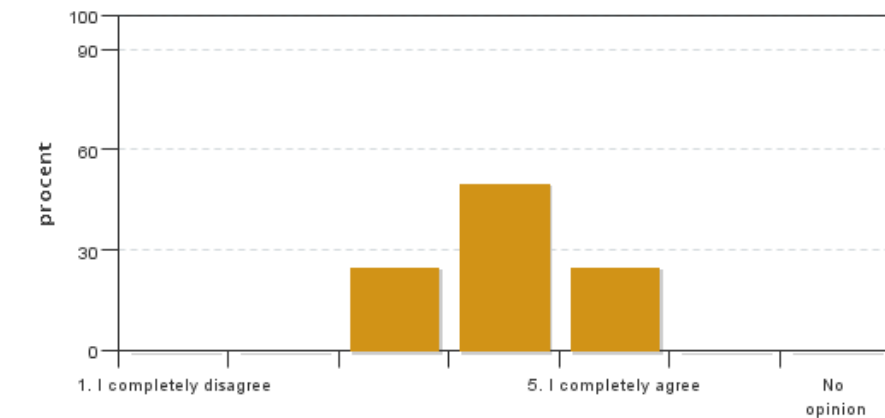


Answers: 4
 Medel: 4,5
 Median: 4.5

1: 0
 2: 0
 3: 0
 4: 2
 5: 2

No opinion: 0

14. Soil minerals, lectures and Lab. 1 (VK) – well executed part of the course?

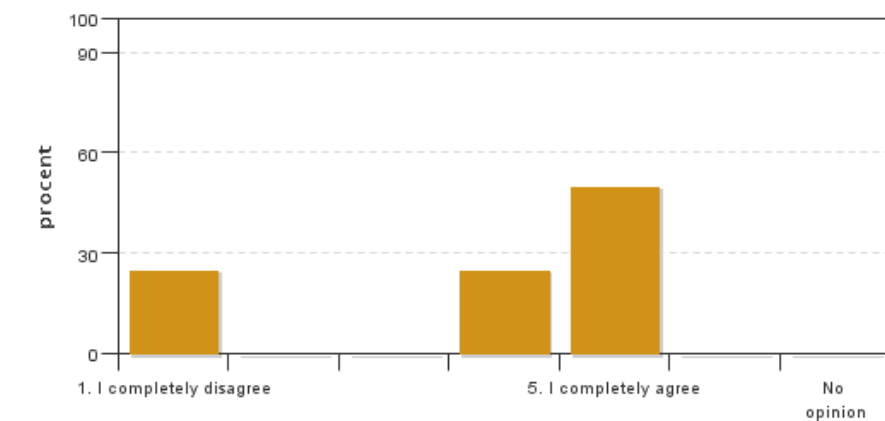


Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 0
 3: 1
 4: 2
 5: 1

No opinion: 0

15. Soil organic matter (DBK) – valuable part of the course?



Answers: 4
 Medel: 3,8
 Median: 4.5

1: 1
 2: 0
 3: 0
 4: 1
 5: 2

No opinion: 0

16. Soil organic matter (DBK) – well executed part of the course?



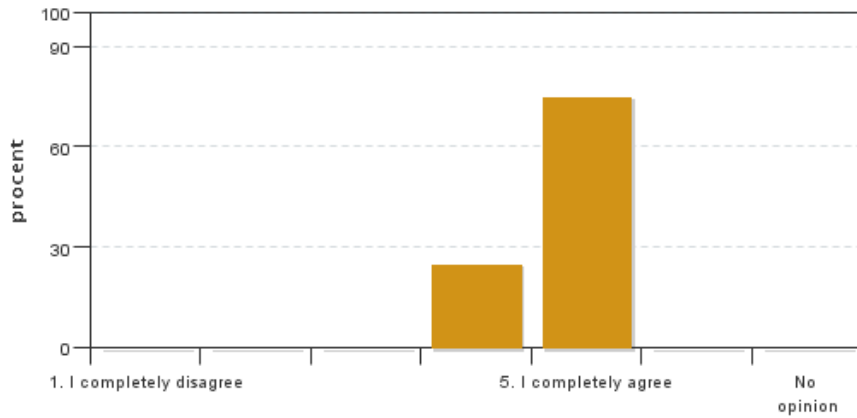
Answers: 4
 Medel: 5,0
 Median: 5

1: 0
 2: 0
 3: 0
 4: 0
 5: 4

No opinion: 0



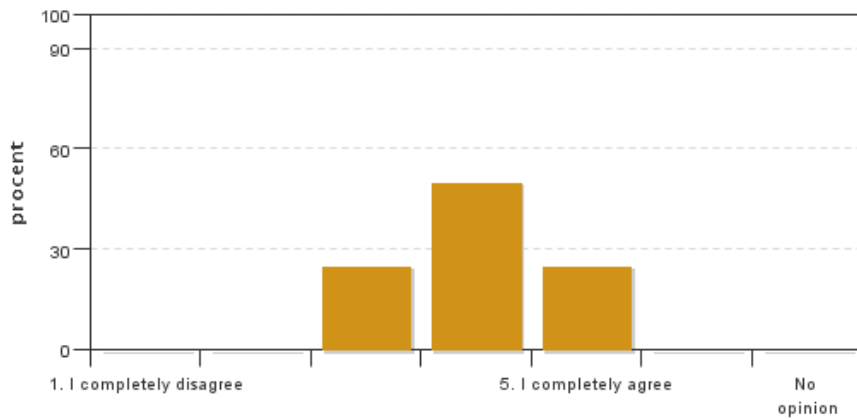
17. Solution chemistry and sorption processes (GC) – valuable part of the course?



Answers: 4
 Medel: 4,8
 Median: 5

1: 0
 2: 0
 3: 0
 4: 1
 5: 3
 No opinion: 0

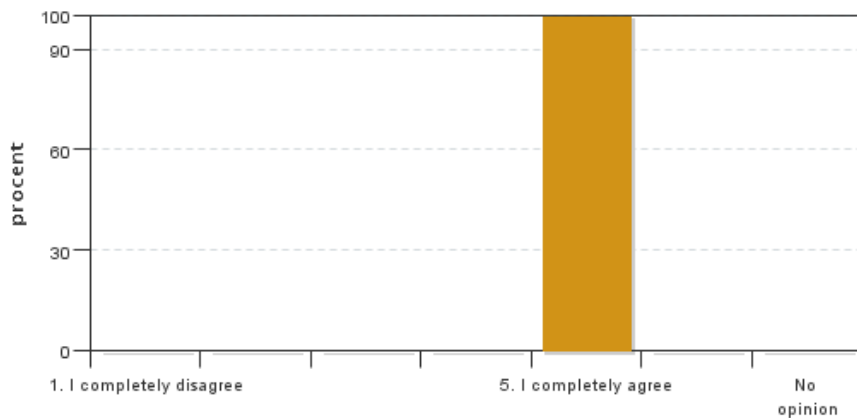
18. Solution chemistry and sorption processes (GC) – well executed part of the course?



Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 0
 3: 1
 4: 2
 5: 1
 No opinion: 0

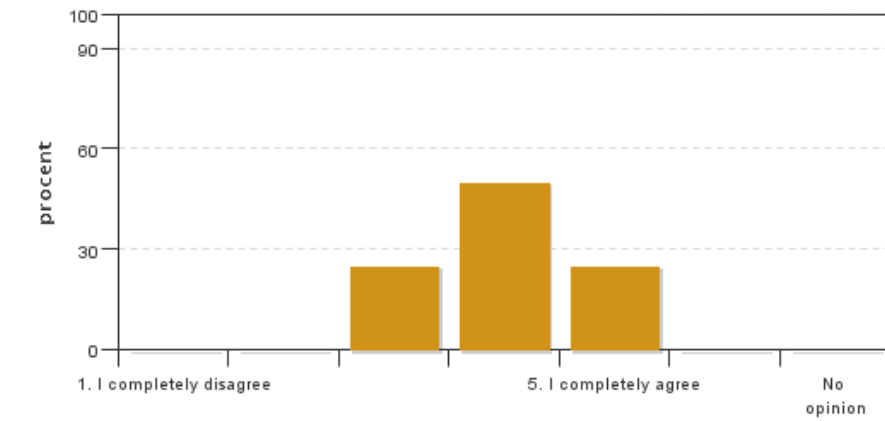
19. Lab. 2. pH dependent solubility of Pb in a contaminated soil – valuable part of the course?



Answers: 4
 Medel: 5,0
 Median: 5

1: 0
 2: 0
 3: 0
 4: 0
 5: 4
 No opinion: 0

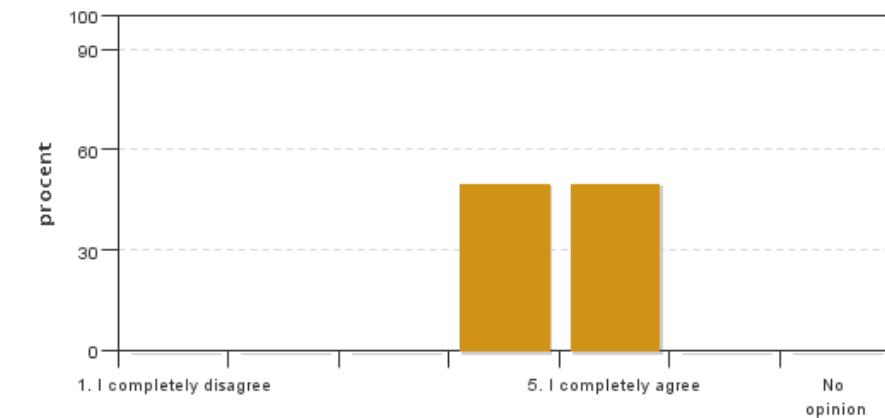
20. Lab. 2. pH dependent solubility of Pb in a contaminated soil – well executed part of the course?



Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 0
 3: 1
 4: 2
 5: 1
 No opinion: 0

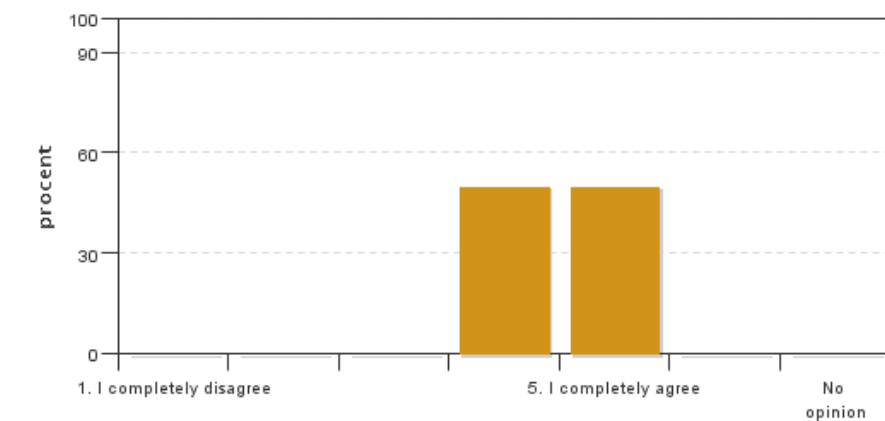
21. Mineral solubility (JPG) – valuable part of the course?



Answers: 4
 Medel: 4,5
 Median: 4.5

1: 0
 2: 0
 3: 0
 4: 2
 5: 2
 No opinion: 0

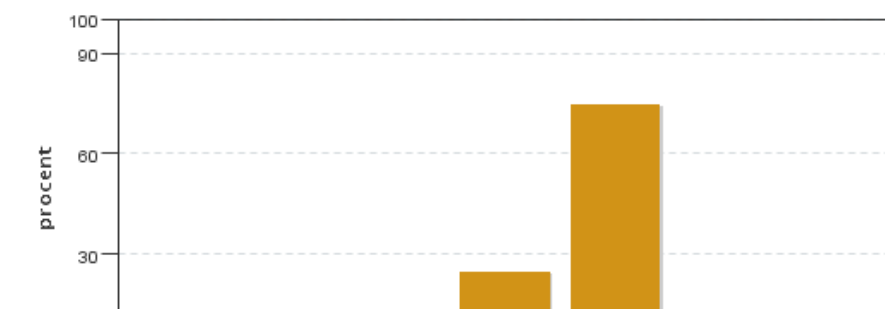
22. Mineral solubility (JPG) – well executed part of the course?



Answers: 4
 Medel: 4,5
 Median: 4.5

1: 0
 2: 0
 3: 0
 4: 2
 5: 2
 No opinion: 0

23. Ion exchange, soil acidity and redox (DBK) – valuable part of the course?

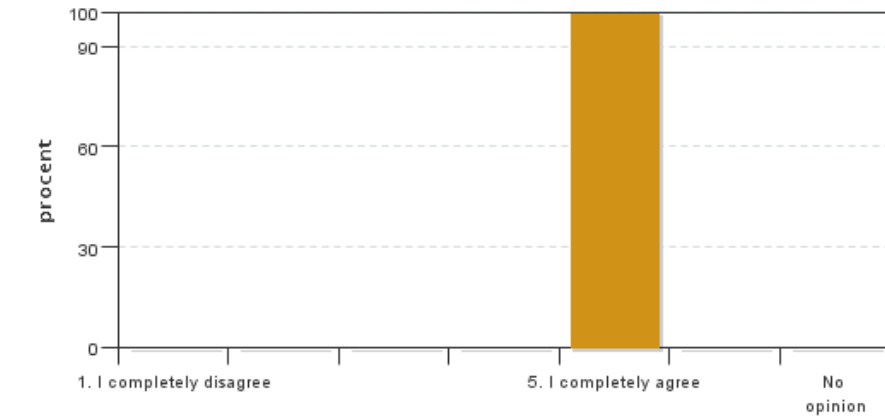


Answers: 4
 Medel: 4,8
 Median: 5

1: 0
 2: 0
 3: 0
 4: 1
 5: 3
 No opinion: 0



24. Ion exchange, soil acidity and redox (DBK) – well executed part of the course?

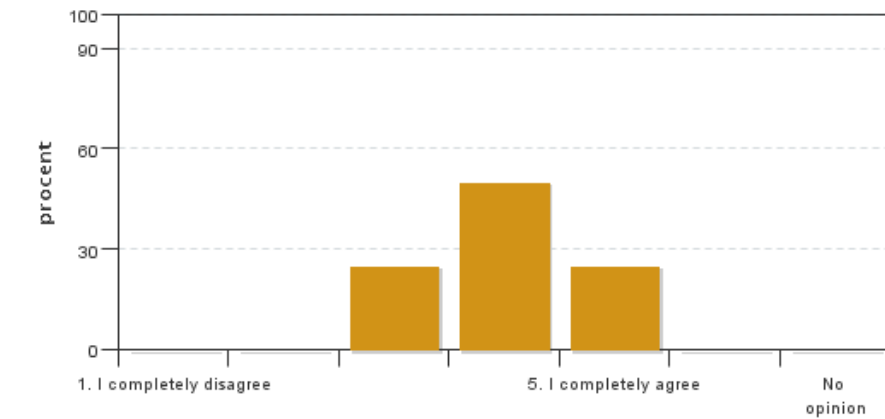


Answers: 4
 Medel: 5,0
 Median: 5

1: 0
 2: 0
 3: 0
 4: 0
 5: 4

No opinion: 0

25. Geochemical modelling (JPG) – valuable part of the course?

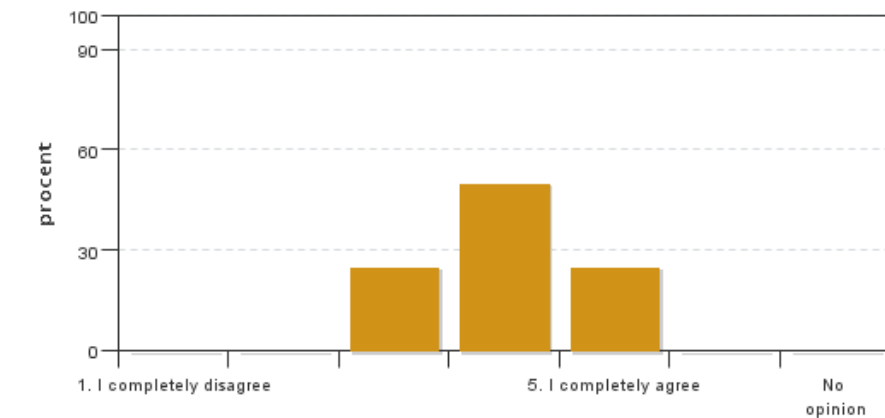


Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 0
 3: 1
 4: 2
 5: 1

No opinion: 0

26. Geochemical modelling (JPG) – well executed part of the course?

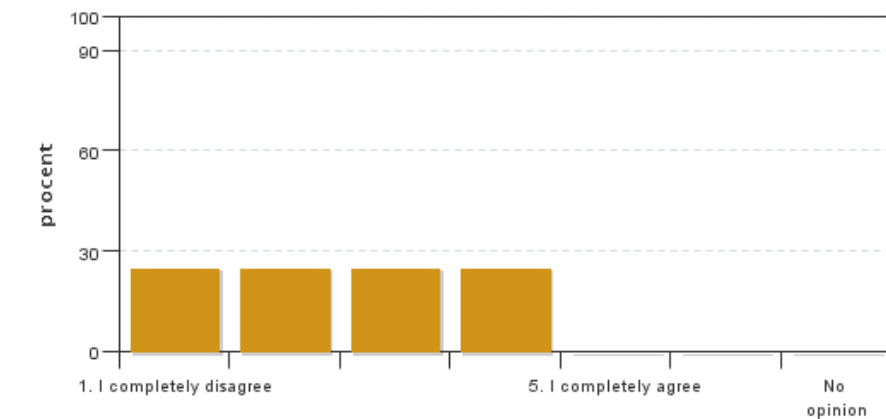


Answers: 4
 Medel: 4,0
 Median: 4

1: 0
 2: 0
 3: 1
 4: 2
 5: 1

No opinion: 0

27. Seminar scientific papers - valuable part of the course?



Answers: 4
 Medel: 2,5
 Median: 2.5

1: 1
 2: 1
 3: 1
 4: 1
 5: 0

No opinion: 0

Course leaders comments

I really acknowledge the excellent summary made by the student representative. Very helpful to include comments made at the oral evaluation because of the very low answer frequency. A good indicator that the students in general appreciated the course was that 15 out of 17 students passed the written exam, most of them with a grade of 4 or 5. In general there was a positive attitude among the students during the course, which was very much appreciated by the teachers.

My general impression is that the course content is ok, and there is no general need for a change. There were diverse opinions on the seminar task, which we need to consider. One improvement might simply be to have it earlier during the course.

Yes, we might consider to use Gustafsson et al (2017) as the main course literature.

Student representatives comments

Summary of general feedback on course

The overall impression of the course was good (median 4), with generally high ratings in most parts of the course. Students were very satisfied with the combination of different components in the course (median 4, average 4.3) including lectures, exercises, modelling, lab reports, theory, and mathematical solution of problems. The links to the learning objectives were clear throughout all parts of the course. In order to make the learning outcome and applicability of the course content more prevalent and clearer, students suggested to include short presentations on ongoing research projects from within the department in the introduction session (or during every part) and how concepts from environmental geochemistry are applied.

The timetable could be made more precise, including what kind of session to expect (lecture or calculations) during morning and afternoon sessions for students to prepare accordingly. For most computer-based exercise sessions, a computer room of more adequate capacity should be booked so that students do not have to share computers and can make full use of the tutorials on specialized computer programmes.

Considering course literature, the compendium provided (Gustafsson et al. 2007, Soil and water chemistry) was very appreciated as it was very concise and adapted to the course content. Students recommended it as first literature recommendation to be read during the course, especially considering the relatively little time available.

An average of 38h/week was estimated to be spent on the course, however half of the online evaluation participants spent over 46h/week on the course. The time-intensive character of the course was a major concern for students, as with scheduled classes in the morning and afternoon on all days apart from Wednesdays (morning only), time was limited for reading the recommended literature (Essington et al.) and to catch up with the course content. It was suggested that one buffer day after the most intense parts (e.g. adsorption and complexation) may be helpful to give students a window for reading and processing.

The social environment of the course was overall considered good (med. & average 4) by the students, and in the oral evaluation students expressed a high appreciation of the constant availability of teachers during and after their parts of the course, with a high response rate of most teachers via e-mail and in person to inquiries of students. Especially during the lab report writing sessions, calculations and the modelling parts, this help was very useful. Students found collections of relevant formulas and equations very helpful, that some teachers provided for their parts, and encourage to expand this collection so that all formulas and equations for all parts are readily available and known. Regarding the gender and equality aspect regarding content and teaching practices students mainly

completely agreed (median 5, average 4.3). For the content of the course, integrating more water-related issues and more examples for application in a Swedish and international context was asked for.

Summary of feedback specific to different parts of the course – value, execution [averages]

Soil minerals & Lab 1 (VK) – value 4.5, execution 4.0

Structure of powerpoint

Students noted that the relevance of the crystallography part might be more stressed, e.g. by referring to it again in the context of mineral solubility part. The lab was very appreciated to ensure understanding, and the exercises with the models were perceived helpful for learning. However, lab instructions for the written report could be clearer, considering structure of report and content that is required. For the exam, more example questions could be provided at the end of the lecture so that students can prepare more easily for exam. The calculation problems in the report were very useful for that purpose. Some students struggled with the structure of the lecture, especially considering the different prior knowledge.

Solution chemistry and sorption processes – value 4.8, execution 4.0 –

& Lab 2 (GC) – value 5.0, execution 4.0

The guide provided by the teacher (GC) was very useful for solving problems, which might have been very useful to be introduced to students from the start as students noted. Students generally appreciated the step-by-step calculation together in class of exercises, but also asked for more time to solve exercise problems on their own (with teacher assistance) after a few example solutions together. The very thorough solution sheet provided for the other example questions was very helpful for exam preparation.

The lab on pH dependent solubility of Pb was rated as very important, and students liked getting practical experience with contaminated soils and to assess different methods learnt in the course before – such as calculations, model predictions and actual measurements by comparing the results. The teachers were very available and supportive in the lab and during report writing sessions for helping with problems, which was emphasized as being both necessary and very helpful. The lab instructions on how and what to calculate before the lab could be improved to make it easier to know what has to be calculated. Instructions for the report content should be made clearer and communicated between all teachers involved in the support for report writing.

Mineral Solubility– value 4.5, execution 4.5- & Geochemical Modelling (JPG) – value 4.0, execution 4.0

The mineral solubility part was found very useful and well executed by the students. The geochemical modelling exercise was important for understanding the theory in a more practical sense, and to understand the complex interactions when parameters and conditions in a system are changed. The structure of the modelling exercise, including an introduction to the software, solving of problems together, followed by solving problems alone and then going through solutions together received very good feedback.

Soil organic matter, ion exchange, soil acidity, redox (DBK)

Students found the hardest part to be ion exchange. The amount of time available for solving exercises with teachers assistance was very helpful, and the use of the whiteboard for important aspects instead of a simple presentation received good feedback.

Environmental chemistry of organic contaminants (KW, JW, LA, MS) – value 4.0, execution 3.5

The lecture on fugacity was perceived as a bit too fast and thus difficult to follow. Time-wise the schedule would have permitted to slow down as the session finished early. Students found the collection of formulas and equations for the fugacity calculations helpful, but recommend including a key so it is clear which parameters are meant by the different abbreviations. The modelling exercise was very useful for understanding the theory and how the different levels of the model would change.

The PFAS lecture gave good examples for connecting theory and ongoing research. The assignment on PFAS remediation with a limited time period to assess a remediation method received very good feedback due to its applied character, and simulation of working conditions. Suggestions for improvement were to include different cases and remediation methods for different groups and include presentations in the whole class for the specific cases. It could be extended to e.g. metal contamination.

Contaminated soils, risk assessment and remediation (DBK, ME) – value 3.5, execution 3.5

The part on contaminated soils was found by most students to be important to understand the relevance of the course. The assignment of PFAS remediation that connected remediation methods with organic contaminants could be extended to metal contamination cases (see above).

Seminar scientific papers – value 2.5, execution 2.8

Opinions on value and execution of the seminar with scientific papers was a major point of disagreement between the students (between complete disagreement and agreement, 1-4). Some students appreciated the seminar and found it useful for applying knowledge gained in the course, and to get an insight into ongoing problems and research. On the other hand, some students found it hard to understand the other groups' message from presentations and mentioned the relative long time the preparation took and the timing before the exam. Students suggested that papers could be included in the parts they most likely fit into throughout the course, or that smaller tables could be formed which consists of one expert of each topic and then small table presentations and discussions could be conducted. But there was no general agreement among the students on how to best implement the scientific papers in the course.

Kontakta support: it-stod@slu.se - 018-67 6600