

## Course analysis

<b>Course name and course code:</b>  Advanced Organic Chemistry, KD2310	<b>When the course was conducted:</b>  HT 2021, Period 1
<b>Course coordinator:</b>  Markus Kärkäs (course coordinator, examiner, lecturer, teaching assistant, seminar leader)	<b>Other teachers in the course:</b>  Peter Dinér (lecturer)  Helena Lundberg (lecturer, teaching assistant)  Fredrik Schaufelberger (teaching assistant)
<b>Number of registered students:</b>  35 officially	<b>Degree of examination after the 1st examination occasion:</b>  20 A–E of 27 in total = 74% of the students that wrote the exam
<p><b>Explain how the students' views on the course have been obtained (course evaluation form, course evaluation board, other), as well as main views from the students:</b></p> <p>The students' views were obtained through a course survey that was divided into two parts, consisting of one part that contained questions from the LEQ and another part containing more course-specific questions. 54% of the students (19 of 35) responded to the survey.</p> <p><b>2021:</b> Overall, the LEQ-evaluation indicates that the students are satisfied with the layout of the course. From the LEQ evaluation, it can mainly be seen that the questions that result in lower scores come from questions that relate to “The intended learning outcomes helped me to understand what I was expected to achieve” (Question 1), “I regularly spent time to reflect on what I learned” (Question 3) and “I was able to learn from concrete examples that I could relate to” (Question 13). The lower scores of Questions 3 and 13 can perhaps be explained by the fact that the course does not contain a laboratory part where the students, for example, receive continuous feedback from the lab assistants regarding laboratory journals and laboratory reports.</p> <p>In the course-specific evaluation there was nothing that stood out in the evaluation. One can note that the students appreciate the pre-recorded videos as this makes it possible to watch the videos when the students want / have time and several times over. As usual, one can note that the students only prepare a little for the lectures and that few students continuously read the course literature.</p> <p>In general, the students' perception and experience of the course is (very) positive.</p> <p><b>2020:</b> <i>Överlag så visar LEQ-utvärderingen att studenterna är nöjda med upplägget på denna kurs. Jämfört med 2019 ser vi en tydlig försämring för fråga 10 i LEQ (“I was able to learn by collaborating and discussing with others”) vilket är att förvänta sig när en stor del av kursen ges på distans. Lite oroväckande är att studenterna inte anser i särskilt hög utsträckning att “My background knowledge was sufficient to follow the course” (fråga 4). Dock är det oklart om det är de</i></p>	

internationella eller inhemska studenterna som anser detta.

*I den kursspecifika utvärderingen kan man se att studenterna uppskattar de förinspelade videorna då detta möjliggör att se videorna när studenterna vill/har tid och flera gånger om. Som vanligt kan man se att studenterna förbereder sig lite inför föreläsningar samt att väldigt få studenter kontinuerligt läser kurslitteraturen.*

*Men i allmänhet är studenternas uppfattning och upplevelse av kursen (väldigt) positiv.*

#### **Describe how the course has developed from the previous course offering:**

**2021:** Fredrik Schaufelberger (newly appointed Assistant Professor at the Division of Organic Chemistry) was introduced as a new teaching assistant. Thus, the exercises/workshops were shared between Markus Kärkäs, Helena Lundberg and Fredrik Schaufelberger. Due to covid-19, the lectures were given as pre-recorded videos while the exercises/workshops were given at the campus. As a complement to the lectures, question sessions were given through Zoom. However, the attendance for these question sessions were rather low with approximately merely 10 students showing up.

For the exercises/workshops, the hand-in questions were kept at 2 hand-in questions per exercise/workshop. The main reason being that the students would, hopefully, study more before the exam, i.e. continuous examination. The students' answers to the hand-in questions were collected through Canvas (by creation of "Assignments"), enabling the students to directly see the teachers' corrections and obtaining feedback.

**2020:** Detta år reducerades antalet lärare på kursen från 5 till 3 stycken, dvs inga externa föreläsare bjöds in pga Covid-19. Kursansvarig gav ca 40% (6 av 15 föreläsningar) och höll i föreläsningen om "grön kemi" (som vanligtvis ges av en extern föreläsare/lärare) medan Peter Dinér gav 33% och Helena Lundberg gav 27% av föreläsningarna. Denna kursomgång gavs föreläsningarna som förinspelade videor medan övningarna hölls på campus. I slutet av varje föreläsning infördes en så kallad "**checklista**" där diverse koncept och/eller reaktioner som är viktiga för tentan inkluderades. Detta för att studenterna snabbt skulle kunna överblicka ifall de har förstått/kan föreläsningmaterialet.

För övningarna så utökades antalet inlämningsuppgifter från 1 till 2 stycken för varje övning. På så sätt hade studenterna möjlighet att samla på sig ytterligare bonuspoäng (ökning från 6 till 15 poäng jämfört med föregående år) som kunde användas till resultatet på tentan. För inlämningsuppgifterna så skapades "**assignments**" i **Canvas** så att studenterna direkt kunde ladda upp sina svar till Canvas. Detta möjliggjorde att studenterna direkt kunde se rättningen via Canvas och få feedback på eventuella fel/misstag de gjort.

**Sammanfattningar** i form av Powerpoint/pdf gjordes för Organisk kemi 1 (KD1230) och Organisk kemi 2 (KD1270) så att studenterna lättare kunde repetera innehållet i dessa kurser. Detta är troligtvis extra uppskattat av de internationella studenterna som snabbt kan få en överblick över innehållet i de föregående kurserna och på så sätt befatta sig med de koncept som ingått i tidigare kandidatkurser.

#### **Comments from other teachers:**

Peter Dinér, Helena Lundberg and Fredrik Schaufelberger have read and commented the course analysis.

**Suggestions for changes to the next course offering:****2021:**

- Schedule the question session on the Green Chemistry project a bit later in the course. Hopefully, this will enable more students to have started working on the project before the question session takes place.

**2020:**

- Göra en kurssammanfattning (liknande de som gjordes för KD1230 och KD1270) som summerar centrala/viktiga koncept och reaktioner som behandlas under kursens gång. Detta kan antingen ges som en repetitionsföreläsning eller som bakgrundsmaterial till masterkursen "Selektiv organisk syntes" (CE2385).

**Does this course have intended learning outcomes within the field of environment and sustainable development?**

**JA.** Green chemistry (Sustainable chemistry) is the focus of one of the lectures (usually given by an external lecturer) and in the project part of the course (see below).

**In such cases, how are these examined?**

In the project part of the course (PRO1, 1.5 credits), the students in a group will analyze how "green" (sustainable) the syntheses of various drug substances are with regard to E-value, health risks, and energy efficiency. The results of their analysis will be presented orally at a half-class seminar.

**Other**

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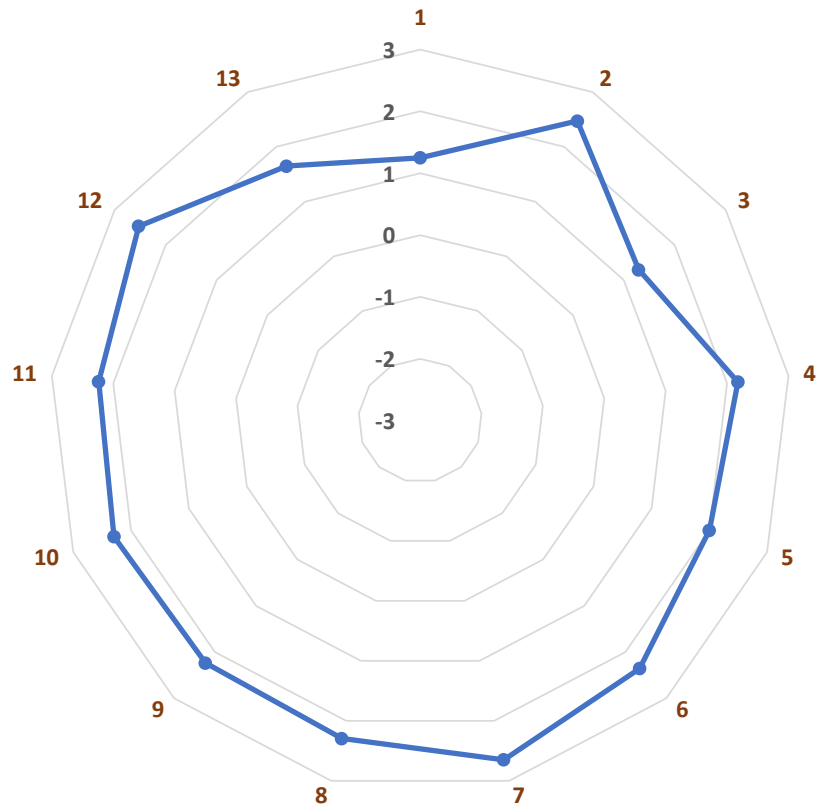
## Course evaluation

### Learning experience questionnaire (LEQ)

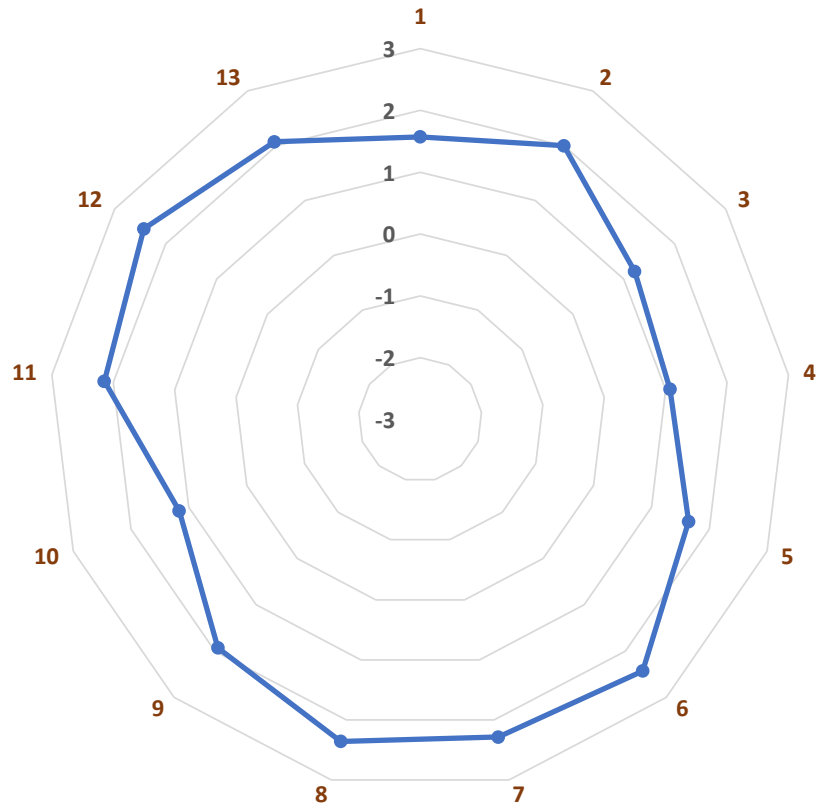
(Scale: -3: completely disagree with the statement... 0: neutral to the statement... +3: completely agree with the statement)

- 1** The intended learning outcomes helped me to understand what I was expected to achieve
- 2** I worked with interesting and engaging issues
- 3** I regularly spent time to reflect on what I learned
- 4** My background knowledge was sufficient to follow the course
- 5** I received regular feedback that helped me to see my progress
- 6** The course was challenging in a stimulating way
- 7** I understood what the teachers were talking about
- 8** Understanding of key concepts had high priority
- 9** The course activities helped me to achieve the intended learning outcomes efficiently
- 10** I was able to learn by collaborating and discussing with others
- 11** I was able to learn in a way that suited me
- 12** I understood how the course was organized and what I was expected to do
- 13** I was able to learn from concrete examples that I could relate to

2021



2020



295069:

What was the best aspect of the course?

The interesting subject and fantastic lectures that gave an in depth understanding of the material.

The structure of the course makes it really clear and entertaining to follow

Intressanta föreläsningar!

I really liked the first half of the exercises where we got to tackle difficult problem and could ask for help when we got stuck. It really helped develop our understanding on how to solve the problems.

The exercise session conducted were helpful.

The best aspect of the course is definitely the teachers. You explain everything very well in the lectures. Also, in the exercises you have all shown your expertise and enthusiasm for organic chemistry and it is admirable and inspiring how good you all are at this subject, how well you teach us students and how much you all seem to like organic chemistry.

It was interesting to see how the chemistry are used in industry.

I really liked that the lectures were on Canvas to be able to rewatch different parts and that the exercises was at school. It made it much easier to ask questions and all teachers was very nice and explained the different parts clear.

Intresting topics and cool new mechanims

I think the best thing with the course is how well all of you teachers managed to make the topics of this course (despite being such a broad course) more 'theory-based', rather than being a subject with a bunch of facts to memorize. It's hard to get around it in organic chemistry but it is appreciated as I think the reasonings as for why things react the way they do will help us better in the future.

The lectures that were in video version and we could watch the videos as many times as we wanted so we have the access to explanations whenever we want.

The pre-recorded lectures made it very easy to be able to learn the material of the course in a tempo that best suited me. So if I wanted to speed up one week and slow down another week it was possible.

Helenas lecture videos was the only good thing in this course.

The teachers! They were enthusiastic, patient with questions, and always there to offer help. Tack för det!

Lärarna, kändes som ni verkligen brinner för organisk kemi och det var väldigt givande att diskutera uppgifterna på övningarna med er. Sedan så gillade jag formatet på övningarna där man fick presentera en uppgift på tavlan efter halva tiden.

I really liked the fact that videos are pre-recorded, because I was able to follow with my rhythm and take the time I needed for each concept.

Most of courses are clear (except the one on Green Chemistry which is not well organized).

295070:

What would you suggest to improve?

More practice questions!

Having lab could be interesting to apply the concept shown in class. Otherwise nothing to say about the rest.

Övningarna gav inte jätte mycket, redovisningarna tog mycket tid och man lärde sig inte så mycket av det (förutom bra att träna på att redovisa). Hade varit skönt om de som höll i övningarna gick igenom lite exempel också.

I know it was a bit special this year, but I just do really bad with pre-recorded videos. It makes me unmotivated and frustrated, but I know that a lot of people also like it. I also feel like the second half of the exercises didn't give me much personally, and although it's good to practice talking chemistry I think it would be more beneficial to just be able to continue working in groups.

To conduct classes on campus.

In some lectures you've shown mechanisms from the book but you state that you don't agree with how they are drawn. I think it gets slightly confusing so one suggestion is that you draw your own mechanisms instead if you don't think the examples in the book are correct. One example I can think of now is how to draw arrows in radical chemistry.

Clarify even more what the key points of every lecture are. the topics that the course go through are great but since every lecture covers so much it can be hard to retain the information, it is hard to remember the specific cases especially since the course only spans six weeks. I think it would be great if you tried to be almost overly clear about what the general pattern is for each topic.

Have a summary- lecture in the end.

Adding several laboratories to the course would be really helpful.

It would be fun to have labs.

the exercise sessions. We didn't learn anything since we rushed through too much in 45 minutes. So it was just one hour of pure anxiety where you have to prepare to present to class. Then you expect us to understand those complex problems that our classmates presented on the board? REALLY? That's the worst form of learning I've ever been through. Improve this format, PLEASE

Even more practice questions to do before the exam! The exercises and old exams help, but it would be nice with even more questions to work with.

295071:

What advice would you like to give to future participants?

Continuous repetition is key.

Don't mind asking questions to the teachers, they are really open and pedagogue.

Häng med i kursen och gör alla inlämningsuppgifter!

The course contains a lot of theory and you won't be able to squeeze it all into your brain during the exam period, so just try to do it along the way too.

Start studying from the beginning.

Go to the exercises!!! I feel many like many didn't want to come after realising that you might have to present a solution to a question for all the students that are attending. I don't think one should feel discouraged by this. In fact, the things I remember the most from this course are the things that I presented and discussed with my peers and teachers in the exercise. The teachers are fantastic and will gladly help you and make sure that you've learned.

To do all the exercises after the exercise to learn the different part of the course in time.

Don't take another time consuming/ very advanced course at the same time. Go through the lecture notes repeatedly throughout the course. Participate in the exercise sessions and do all of the exercises, including the ones that aren't covered in the work-shops or are hand-ins. Make a list of all reaction mechanisms and name reactions.

If your background is not enough for the course, try to study in advance to make yourselves ready to start the lectures.

Start early and do the exercises ahead of time to make sure you actually understand the problems.

if you dont like organic chem, dont do this course just to do a course, its hard

Go to the exercises, keep up with the work, and ask questions.

Start early with the exercise problems and do as many as you manage. When the solutions are published try do the rest of the problems and draw the mechanisms, instead of doing all at the exam period.

To learn the course before coming to the exercise session (quite obvious advice)



295072:

Is there anything else you would like to add?

Great course <3

I've already done the quiz but I forgot to add:

Thank you.

Till tentan var det många som hade med sig miniräknare. Det var inte specificerat att man fick ha med sig det så jag hade inte det. Miniräknare hade varit väldigt skönt att ha så det kändes väldigt orättvist att några hade miniräknare trots att man inte fick

During the exam I saw SEVERAL people using calculators and neither the invigilator nor Markus said anything about it. Especially now that we had to do some calculations (even though it was basic addition and subtraction) I feel it is highly unfair that some people got the advantage of simply being able to use a calculator, where the rest of us spend a lot more time on calculating and double checking by hand, leaving less time for the rest of the exam.

It felt like the exam focused on certain parts that, in my opinion, seemed less important as these area were only briefly covered in lectures and excercises.

I enjoyed that the teachers was very involved during the exercises. It made the harder parts more motivating and also easier to ask questions.

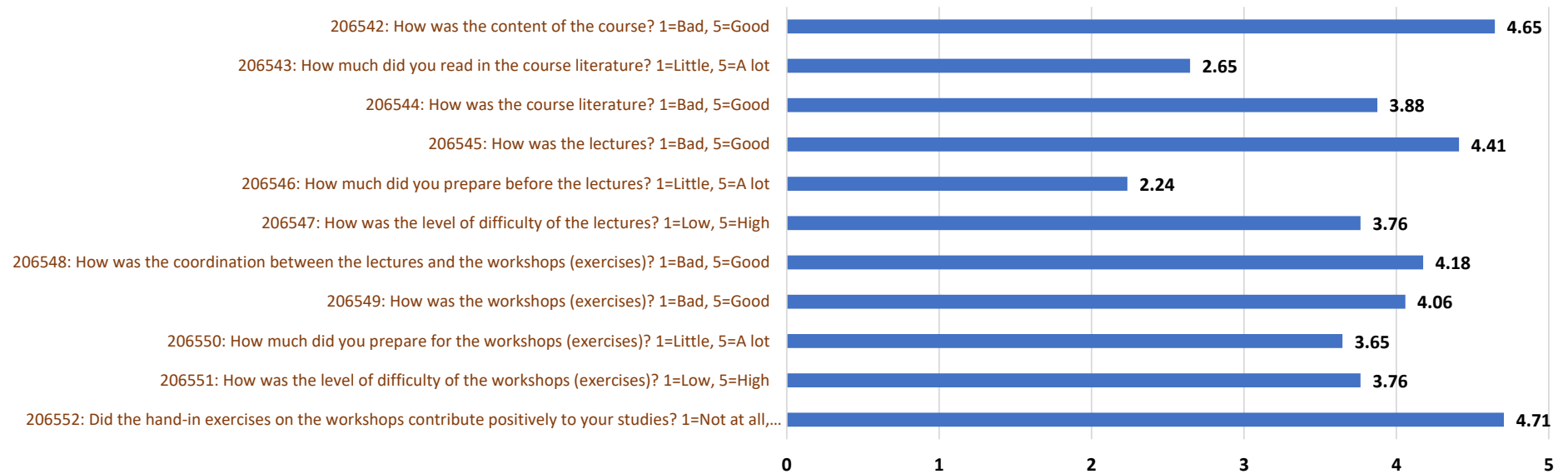
Thanks the lecturers for their perfect job.

Thank you for a very interesting course!

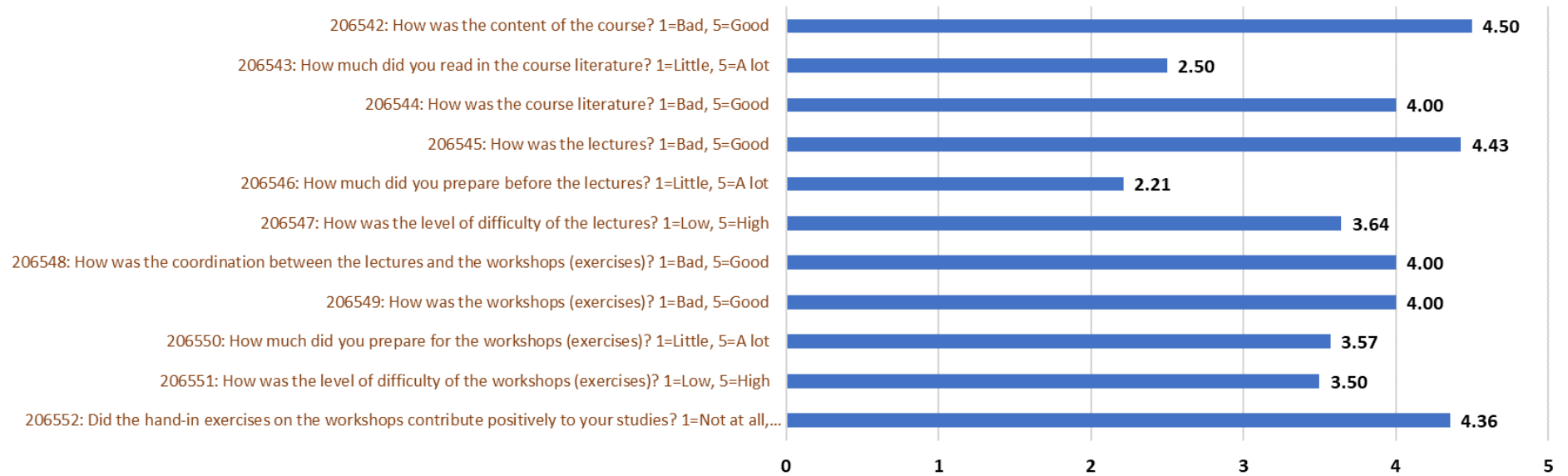
Sometimes it was complicated to stay focus on the presentation in exercise session. But the principle of working during one hour on an exercise and then present it, is really good I think because you're involved in what you're doing and you're forced to understand.

## Course specific evaluation

2021



**2020**



295084:

Other comments and suggestions for improvement of the course are welcomed!

Lectures

More interactive lectures

295085:

Other comments and suggestions for improvement of the course are welcomed!

Workshops (Exercises)

Förklarade lite ovan men mer genomgångar av exempel hade varit bra!

295086:

Other comments and suggestions for improvement of the course are welcomed!  
Green Chemistry Project

Föreläsningen i green chemistry gav inte mycket, den föreläsningen borde förbättras. Projektet i sig var roligt och givande!

I dont quite understand why we have to in the articles for specific amounts that were used in the chemical process. It just took a lot of time to match how much of each reagent is used and which step they were used as the experimental section was not so organized in our article. Since the goal was to calculate AE, RME and E-factor, it would be easier to get a table of how much of each reagent was used. It felt like 70% of the time we put on the project was just understanding what step they were talking about and extracting the correct amount from the experimental section.

I think it would be nice to have the project maybe a week earlier. The last week was very stressful for me, so being able to spread it out a little would be appreciated.

I felt uncomfortable with the fact of presenting figures in an oral presentation. Maybe a report should be more suitable for this kind of exercise. Because we have spent a lot of time doing the calculations and have to make decisions and with this format what we did is not really reflected.

295087:

Other comments and suggestions for improvement of the course are welcomed!

Anything else

Thank you for a nice course! I think you have been great teachers and the exercises were really helpful. You guys were always pedagogical, never focusing on what was wrong, but always helping us strive towards being better. :)