

**Kursanalys**

<b>Kursens namn och kurskod:</b> Advanced Organic Chemistry, KD2310	<b>När kursen genomfördes :</b> HT 2018, period 1
<b>Kursansvarig:</b> Peter Dinér (Kursansvarig, Lärare, Examinator)	<b>Övriga lärare i kursen:</b> Peter Dinér (kursansvarig, examinator, föreläsningar, seminarie) Markus Kärkäs (övningar, seminarie) Mats Jonsson (föreläsning) Mats K G Johansson (föreläsning) Per-Olof Syrén (föreläsningar) Brian Timmer (föreläsningar, seminarie) Krister Zetterberg (föreläsningar) Tobias Rein, Chemnotia (ext. föreläsare) Daniel Petersson, AstraZeneca (ext. föreläsare)
<b>Antal registrerade studenter:</b> 27 officiellt, men endast 23 aktiva.	<b>Examinationsgrad efter 1a examenstillfället:</b> 22 st A-E av 23 totalt = 96% 92% av de som skrev tentan
<b>Redogör för hur studenternas synpunkter på kursen har inhämtats (kursenkät, kursnämnd, annat), samt huvudsakliga synpunkter från studenterna:</b> <p>Studenternas synpunkter inhämtades genom en kursenkät som var uppdelad i två delar bestående av en del som innehöll frågor från LEQ och en del som innehöll mer kursspecifika frågor. 74% av de aktiva studenterna (17 av 23) svarade på utvärderingen.</p> <p><b>2018:</b> Överlag så visar LEQ-utvärderingen att studenterna är nöjda med upplägget på denna kurs. Jämfört med 2017 ser vi en klar förbättring av resultaten, både i LEQ och i den kursspecifika kursutvärderingen (se kursutvärdering nedan). De lägsta resultaten erhöles för punkter 1-5 i LEQ, men inget värde var oroväckande lågt. För att förbättra ” The intended learning outcomes helped me to understand what I was expected to achieve” så kan man behöva poängtera kursmålen tydligare vid kursstart, men eftersom målen ska skrivas om inför nästa termin är detta ett utmärkt tillfälle att förtydliga dessa.</p> <p>I den kursspecifika utvärdering så har det också skett en generell förbättring i studenternas svar. Att kursen kunde drivas under mindre stressade förhållande än förgående var förmodligen en orsak till att</p>	

kursen mottogs bättre. Mer specifikt kan man se att övningarna förbättrades mest, vilket beror på att Markus Kärkäs tagit över som övningsledare. Största skillnaden var att han införde "collaborative learning" (gruppsamarbete) som föll väldigt bra ut bland studenterna.

På det hela taget har det skett en förbättring av studenternas uppfattning och upplevelse av kursen.

*2017: Från LEQ-utvärderingen kan man främst se att låga poäng kommer från frågor som handlade om "I regularly spent time to reflect on what I learned", "I received regular feedback that helped me to see my progress", och "The course activities helped me to achieve the intended learning outcomes efficiently". Personligen tror jag att det har att göra med att kursen inte innehåller några labbmoment (till skillnad från t ex. OK2) där studenterna omsätter den teori som de möter på föreläsningar och övningar i praktiken vilket ger ett bättre perspektiv på materialet. På kurslabb kan de också interagera mer med labbassistenter som också ger feedback på labbjournaler och labbrapporter samt att de har förberedelser inför varje labb vilket tvingar studenterna att följa med i kursen. Man kan fundera på om man ska införa en labbdel i denna kurs, särskilt med tanke på att Selektiv organisk syntes ställts in de senaste åren.*

*En sak som togs upp var att försöka betona de viktiga koncept som går igenom på varje föreläsning. Givetvis är det svårt att med 8 olika föreläsare, men jag tycker generellt att det är en bra idé som man bör försöka genomföra. En del studenter verkade ha för låga förkunskaper, vilket betonar vikten av att kolla kunskaperna hos de utbytesstudenter som läser kursen.*

*På den kursspecifika utvärderingen var det inget som stack ut i utvärderingen. Som vanligt kan vi se att studenterna gillar föreläsningarna (eftersom de inte behöver förbereda sig) och att övningarna generellt får ett lägre betyg. Svårighetgraden verkar vara OK, men jag tror att man måste jobba med övningarna mer. Det verkar som att alla är positiva till Green Chemistry project.*

Beskriv hur kursen har utvecklats från förra kurstillfället:

**2018:** Förra året framkom en del synpunkter på att kursen var lite repetitiv (samma innehåll som KD1270), vilket främst berodde på kort förberedelsetid för kursansvarig/huvudlärare och begränsad tillgång till föregående års kursmaterial. Till detta år byttes enolatkemin ut mot en introduktion i övergångsmetallkemi, främst palladiumkemi inom organisk syntes, vilket fungerade bra och var ett steg mot mer modern organisk kemi. Vidare minskades antalet lärare på kursen (från 8 till 7) för att få en mer koherent kurs.

Nytt för i år var att Markus Kärkäs var övningsledare och höll i alla övningarna. Inspirerad av de diskussioner som förekommit på den pedagogiska kursen "Teaching and Learning in Higher Education" (LH231V) så bestämde sig Markus för att applicera konceptet "collaborative learning". Istället för att övningsledaren endast stod framför whiteboarden och löste uppgifter så delades studenterna in i grupper bestående av 4–5 personer. Grupperna fick sedan diskutera och arbeta med övningsuppgifterna medan övningsledaren gick runt och gav feedback till de enskilda grupperna. En student från varje grupp fick sedan komma fram till whiteboarden och presentera gruppens lösning på övningen/problemet varav övningsledaren gav ytterligare tips på hur man kan tänka för att lösa uppgiften. Från kursutvärderingen ("What was the best aspect of the course") kan man se att detta koncept var väldigt uppskattat av studenterna.

*2017: Kursansvarig (Peter Dinér) tog över kursen den 7 juli efter att utsedd kursansvarig meddelat att han inte kommer att hålla i kursen. Eftersom kursen startade 28 augusti samt att allt material i BILDA försvunnit, fanns ett mått av panik kring organisationen av kursen. För att kursansvarig skulle ha en möjlighet att överhuvudtaget genomföra kursen, organiserades kursen genom att ta in ett stort antal föreläsare som gav olika avsnitt. Kursansvarig gav ca 40% (7 av 17 föreläsningar) medan de andra föreläsningarna spreds på ca 8 andra föreläsare. Johan Franzén höll i alla*

övningar.

*Eftersom tidigare kursmaterial endast fanns tillgängligt som PDF-material gjordes det stora insatser utvecklingar av kursmaterialet, både på föreläsnings-powerpoint (ca 150 slide för kursansvarig) och rekonstruktion av projekt. Det finns stor potential att förbättra innehållet till nästa år.*

Synpunkter från övriga lärare:

På grund av det stora antalet lärare har jag valt att inte ta in skriftliga synpunkter från dessa. Markus Kärkäs har hjälpt till att skriva av denna kursanalys tillsammans med kursansvarig.

Förslag på förändringar till nästa omgång:

**2018:**

- Från kursutvärderingen kan man se att uppgifter som relaterar till radikalkemi och Hammett-parametrar bör inkluderas (bättre) i övningarna. Denna modifikation diskuterades mellan övningsledaren och kursansvarig redan innan kursutvärderingen gjordes. För att förbättra detta "glapp" så bör man också modifiera föreläsningmaterialet om radikalkemi så att fokus ligger på syntetisk organisk kemi.
- Eftersom avdelningen för organisk kemi under de senaste åren haft få undervisande lärare så har avdelningen tvingats använda sig av ett flertal lärare (7-8 st). Förhoppningsvis kommer avdelningen för organisk kemi få in ett antal unga forskare/gruppledare som är villiga att undervisa inom en snar framtid vilket kommer göra det lättare att ha lärarträffar för att diskutera och möjliggöra en mer koherent presentation av föreläsningmaterialet.
- Modifiera ett av "grön kemi" projekten för att tydliggöra "grön kemi" aspekten. Man bör också förlänga presentationstiden vilket underlättar/förbättrar efterföljande kemidiskussioner.

**2017:**

- *Förmodligen skulle det vara bäst att använda ett mindre antal föreläsare så att det blir en mer koherent presentation av materialet.*
- *Man bör också se över materialet så att minimera överlappet i innehåll mellan KD1270 och KD2310.*
- *Modifiera ett av projekten så att det får en mer uttalad grön inriktning.*
- *Modifiera vissa av övningarna för att bättre stämma överens med föreläsningarnas innehåll och nivå.*

Har denna kurs lärandemål inom området miljö och hållbar utveckling (JA)?

**JA.** Grön kemi (Hållbar kemi) behandlas på en av föreläsningarna av extern föreläsare samt i projektdelen av kursen (se nedan).

I sådana fall, hur examineras dessa?

I projektdelen av kursen (1.5 hp) ska studenterna i grupp analysera hur "gröna" (hållbara) synteserna av olika läkemedelssubstanser är map E-värde, hälsorisker, och energieffektivitet. Resultatet av deras analys presenteras muntligt vid ett seminarie i halvklass. Dessutom examineras grön kemi på

tentamen där de ska analysera och jämföra synteser i ett grönt (hållbart) perspektiv.

Övrigt

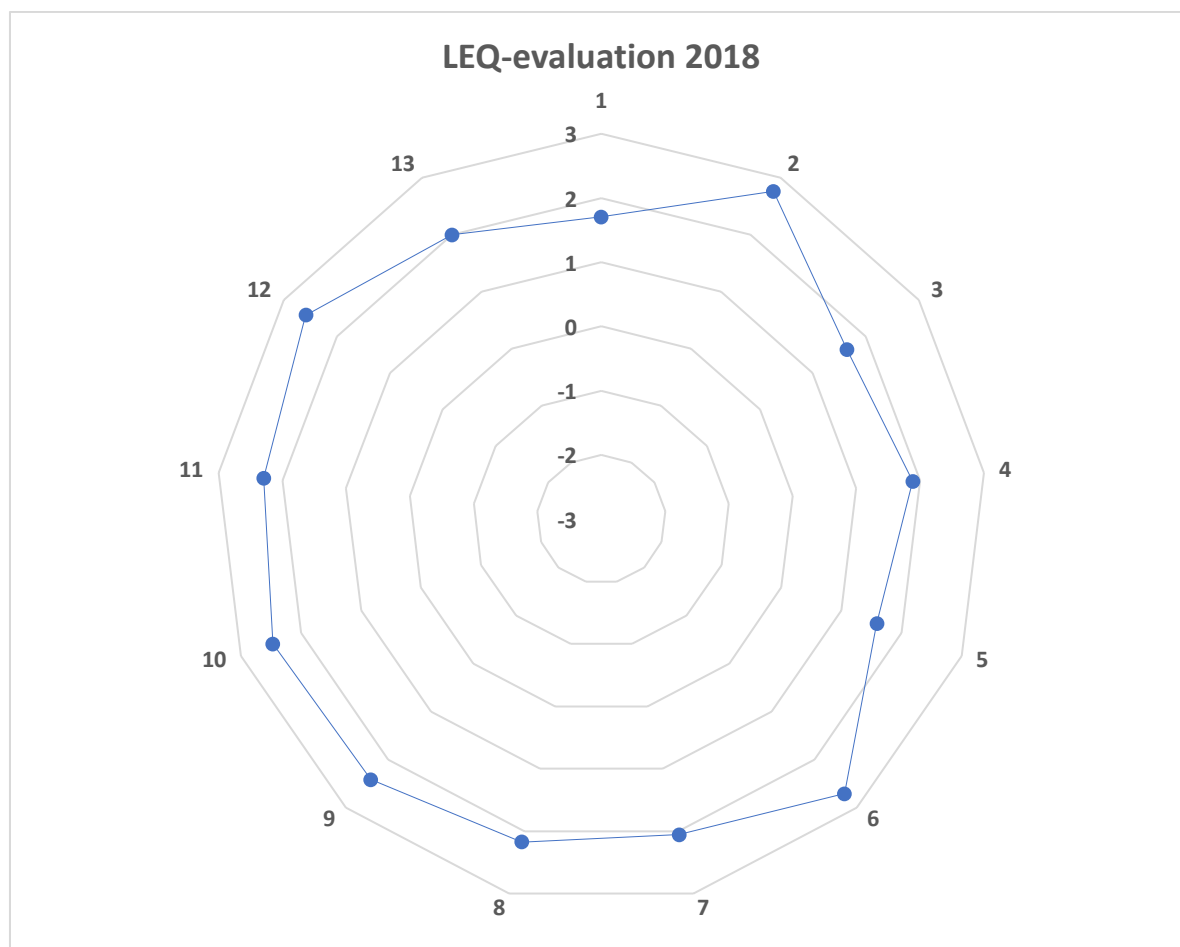
Kursanalysen ska göras inom en månad efter avslutad kurs. Den färdiga kursanalysen skickas till kansli-chebio@che.kth.se. Bifoga sammanställning av kursenkäter och eventuellt mötesanteckningar från kursnämndsmöten etc.

## Kursutvärdering KD2310 HT18

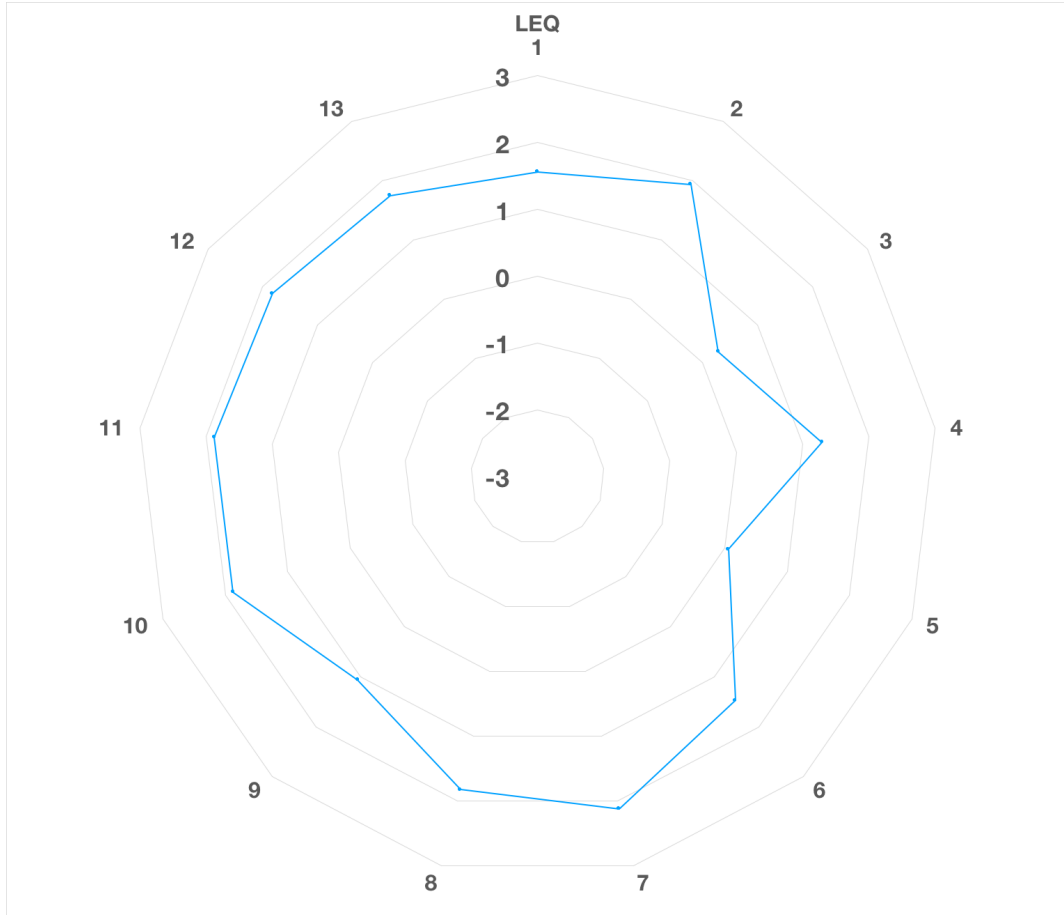
### LEQ

(Skala: -3: tar helt avstånd från påståendet... 0: neutral till påståendet... +3: instämmer helt med påståendet)

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 to relate to



2017



**81635:**

**General questions**

**What was the best aspect of the course?**

The profs and teachers are really professional and helpful! Learning here has been really fun thus far. The workshops also allow us to discuss answers with fellow course mates, and I have learnt a lot from them!

The workshop is very good.

Reaction Mechanisms. Arrow pushing

I think that the combination of lectures with applying the concepts from the lectures on the workshops was great. The lectures are really good and so are the workshops. Working together with others is great.

Fun and interesting way to learn more about organic chemistry.

Learning the content and all the teachers did a great job at keeping me engaged and interested. Also getting to meet people who utilized the course content in their professional lives was a rich experience. The subject and all the people involved in it are all very fun!

Up-to-date knowledge.

Meeting with teachers who are really working in organic chemistry.

The project be introduced in the first lecture so we can spend time to not only reading the provided articles but also research in other resources.

The PhD students were very patient and helpful to us during lectures and workshops.

Exercises help me learn a lot

The workshops

I really liked the way the workshop was made, it was a good way to learn by doing and not only by listening to the teachers.

exercises were quite interesting for me . The questions are related to the lecture, and deepen my understandings toward the topic. Also, the atmosphere created by group work made me comfortable.

The workshops were really good and stimulating. The questions were related to the course content and I appreciated the work form where we sat in groups and discussed one or two questions and each group had a different question and then we went through all questions on the board

Many of the lectures where good and fascinating. The best lectures were the ones where the lecturer used the whiteboard/blackboard. (could follow easily how the reactions worked and what mattered to that teacher).

To learn the deep detail in organic chemistry and some field that can apply these knowledge

it was an inclusive positive environment with lots of good feedback, and challenged me in a good way.

**81636: What would you suggest to improve?**

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More variety of exercises I guess. I think it's fine as is

I think that it would be nice to have radicals and the hammet values on workshops since those are quite important in the course. I think that alot of people concentrate on learning the things from the workshops so that would be a good way to learn those concepts aswell.

Another thing is that the workshops are very focused on only doing mechanisms. Of course they are important but i think it would be nice of there were a few easy questions not focusing on making mechanisms in the beginning of each workshop to learn the concepts from the lectures and then the more complex mechanism questions later where the concepts can be applied.

Me and my group of friends got the impression from the early lectures that the exam would not be super hard since Peter said something in line with "if you have taken Organic Chemistry 2 this should not be a super tough course" and Markus said during the exercises that the problems we solved there was harder than the exam problems.

As soon as we looked at one of the old exams we realised that this was not true.. From all years at kth (1-5) this was probably the hardest exam I have taken. But then it seems like it was corrected quite nicely so that made it easier to pass.

The lack of practical aspects to the course was a little disappointing. Understandably there are administrative issues with finding people to hold labs or organize study trips, but these kinds of course moments really help to consolidate the key concepts of the course. Perhaps one could also schedule a final workshop before the exams for people to ask questions (Like we ended up organizing anyways). But making it more official might increase the incentive for more people to come.

More exercises in each workshops and they should direct towards the real issues in the state-of-art researches. Lectures should also include it (maybe a small part). Because know what we learnt apply for will be a great motivation for students to study.

NIL

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Change the project, I would like a laboratory based project instead. The green chemistry was only repetition from previous courses

In some lectures especially Brians it sometimes went a little to fast and you only had time to write down what he wrote and not what he said.

Th lecture was easy to understand, but I feel that some exercise questions include what we haven't learned so some questions were for memory for me. It's better to clarify what's the main point or what you want us to know through each question.

During the lectures it could sometimes go quite fast, espèce allyl when you drew the mechanisms. It was hard to listen and managed to write down all that you wrote at the same time. During the course you brought up many reaction mechanisms which had beautiful names but many of them were not even mentioned in the exam

Perhaps encourage teachers to use whiteboard/blackboard if they are showing reaction mechanisms and orbitals. The slides could be more complementary. Also, it would be preferable if you could have two days (at least) in between the workshop and the lecture that the workshop assignments are based upon. That made it difficult to work on them in time.

I think pericyclic reactions were very difficult to understand. Could be compensated either by having more lectures or earlier in the course, so people would have more time to work with it.

I want to do some lab :)

I honestly the thnik the course was very well designed and there really isn't anything that needs to be improved, as it suited my learning style very well



**81637:**

**What advice would you like to give to future participants?**

Study consistently and do not hesitate to ask questions!

Study and practice all the time

Work hard before and during the workshops!

Make sure you know your basic organic chemistry and general chemistry. There are things that should be obvious to you, but when they are not it will make everything seem so much harder.

Work together to figure out mechanisms and solve problems continuously throughout the course. The workshop problems that are given are a good representation of what you will need to know on the exam, so use them! The book is also very helpful. Even though it is a big chunk of text associated with this course, the more you can prepare for lectures by reading ahead, the better! Having the book around when solving problems is also good in case you get stuck. It's solutions manual can be downloaded for additional problems, with facit! Also, ask as many questions as you can! The teachers are very approachable, and care about your learning, so take the opportunity when it's there!

Starting your project as soon as possible and also investigate about the mechanism of green project because each non-green step has its own reasons.

NIL

Do your exercises

Prepare before the workshops

Study early because this course contains a lot of information and many things are built on earlier knowledge in the course.

The presentation is so heavy, so you should be careful.

Go to the workshops and the lectures. Try to go through the exercises before the workshops. make a summarum of all the reactions that were brought up during the course and learning them but do also try to understand their concept and why it happens. ask questions

Read the book, spend more time then I did...

Read in the course literature before and after each lecture. Also read again before exam to freshen it up.

I am the one who never get good grade in organic chemistry

I like it, I really love this, but it always difficult for me LOL :)

If you're the one that love organic chemistry but you're still hesitating or worried about difficult content, don't worry and register this course! This is a great challenge that you have to try! You will learn a lot of things from this course.

Do the textbook readings and constantly practice questions from earlier in the course as everything is connectex

**81638:**

**Is there anything else you would like to add?**

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Tough exam, which is fine, and quite fun.

Thanks for a hell of a course! Hope we manage to get selective organic synthesis up and running next year as well! :)

Thank you all teacher for this nice courses. If there is any chance to meet you guys again, I eagerly want to take those courses :D

NIL

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I really liked the course! It was interesting and had a lot that I would like to learn more about. I look forward to the SOS course!

Good lecturers and very interesting topics were brought up during the course

The course is very good and well structured and most lectures encourage one to follow along.

Thank you :)

I'd like to thank Peter and Markus for an awesome course, you know it's going to be a good course when the prof puts on Pearl Jam the first day of class.

## **Course specific evaluation**

How was the content of the course?

How much did you read in the course literature?

How was the course literature?

How was the lectures?

How much did you prepare before the lectures?

How was the level of difficulty of the lectures?

How was the coordination between the lectures and the workshops (exercises)?

How was the workshops (exercises)?

How much did you prepare for the workshops (exercises)?

How was the level of difficulty of the workshops (exercises)?

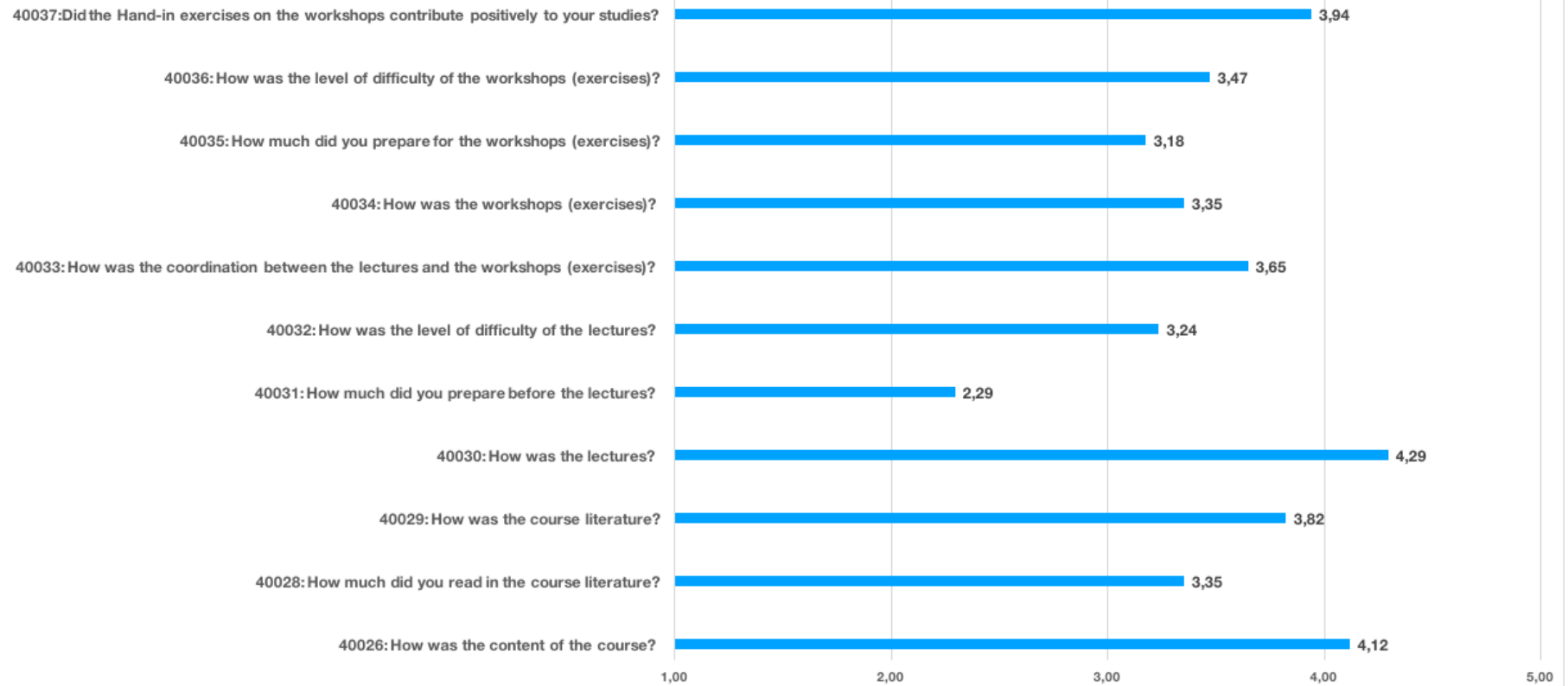
Did the Hand-in exercises on the workshops contribute positively to your studies?

### Course specific evaluation 2018



2017

### Course specific evaluation



**81650:**

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

**Lectures**

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I would suggest adding one extra lecture on radicals. The one we had was good, and interesting, but very introductory, and went through very few mechanisms, and few FMO arguments to why certain radicals will react the way they do (And how reactivity may be controlled) In our education in general, we never really treat radicals properly, so one extra lecture which would follow the content in the book (Which explains radical organic chemistry pretty well in my opinion) would be greatly appreciated I think!

NIL

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I would have really liked to have a time for questions like a two hour workshop but when we just could ask questions before the exam but after all the lectures when you start to recap everything and you get a question from early in the course!

talk more slowly

Use whiteboard and blackboard if possible

Peter, please speak slowly :)

**81651:  
Other comments and suggestions for improvement of the course are welcomed!  
Workshops (Exercises)**

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Do some radicals and also hammet-values on the workshops. And sometimes the lacures and workshops are a bit out of sync.

These were conducted really well, and were very helpful. Maybe you could have a second teacher there to help answer questions, sometimes it felt like there were significantly more hands up than teachers ready to explain, but other than that these sessions were great!

More workshopsss

NIL

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have more space in the schedule between the last lecture regarding that weeks workshop.

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**81652:**

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

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Maybe you can encourage groups with the same compound to work together. That way we pool more heads into the same goal, which would allow us to find more information! Might get a little less interesting for the teachers who have to hear the same things two days in a row, but I think that would make each individual presentation richer for the sake of student's learning!

Need to divide group from the green chemistry lecture. We have 4 lecture together so its enough to know each others.

NIL

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Even though the presentation was heavy, we didn't have much time for the discussion of the presentation.

no

One put down a lot of work, I was personally a bit worried that it could not be seen (from the presentation alone) the time one spent on the project.

I think it would be better if you arrange the group for us, with the different nations and programme that we're studying.



**81653:**

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

**Anything else**

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Nothing more, it was in general an awesome course! If you guys want an extra hand with the teaching of this course next year (Maybe for Övningar or lab course if that becomes a thing), I'll probably be available, and I'd love to keep working with the subject so all the knowledge will stay fresh in my mind!

See you all around! :) //Phill

NIL

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A good course and challenging

Seriously though, great course! Really interesting subjects and well structured!

Actually, I want to do an organic lab, but I know that it take a long time for a reaction and also the purification.