Course report BIO 300A - Academic writing Autumn 2021

Learning outcomes

After taking this course the students should be able to:

- write a master thesis in the IMRaD format

- ask a research question, formulate hypotheses, collect relevant data, and make figures

- write scientific text with flow and style, and critical use of core scientific literature

- present a research project in relevant formats

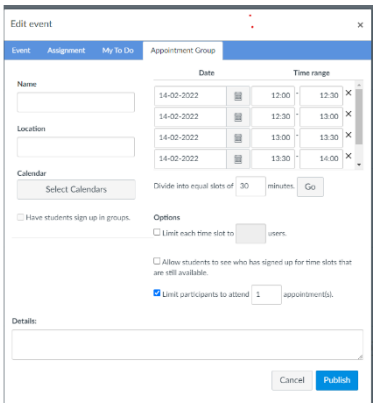
- work with peers to improve a draft text

Course design to achieve the learning outcomes

First, I briefly present the course design, and show the front page of the course in the learning platform (Appendix 1) –which is the information that students get as they start the course. It first shows the learning activities and the assessment, then the time schedule of the course, how the learning activities (class meetings, modules, assignments, feedback, group projects) are organized.

In short, the course contains 12 themes in modules (MittUIB) – the content relevant to academic writing in general and to a master thesis in particular. We presented the modules in weekly seminars on Zoom. The main project for the students was to write an IMRAD paper, with the chapters Material and methods and Results (including two figures) is a group project while the rest is individual writing. The students had to agree on a research question in the group and then find data, produce graphs and do a simple analysis to answer their research question. They also presented the results at the BIO-poster day either as posters or in an oral presentation, and we strongly encouraged students to submit their final papers to the new student journal Bikuben – and take the opportunity to add items to their CV during their studies.

Assessment and feedback loops during the course



Feedback is an essential element of a writing course. First, we had 4-5 teaching assistants, PhD-students, which helped with the feedback. Throughout the course, we set up **meeting times** for the groups to discuss their project with TAs and teachers. We did this in the calendar function of MittUiB – the 'Appointment group' (insert right) where students could sign up for Zoom-chats with us in the time slots we set up. This is a very practical tool for communication with students and gave possibility for continuous follow up of groups and individuals through the whole online course duration.

We included **one written feedback loop on the main assignment** – students could submit a draft version of the paper halfway through the course and get written and detailed feedback from the TAs. With over 100 students in the course, we had to assign one TA to each group while the main teacher could only oversee the commenting. The TAs worked quite intensively with feedback during the two weeks after the submission deadline -and provided detailed feedback in-text on the submitted drafts.

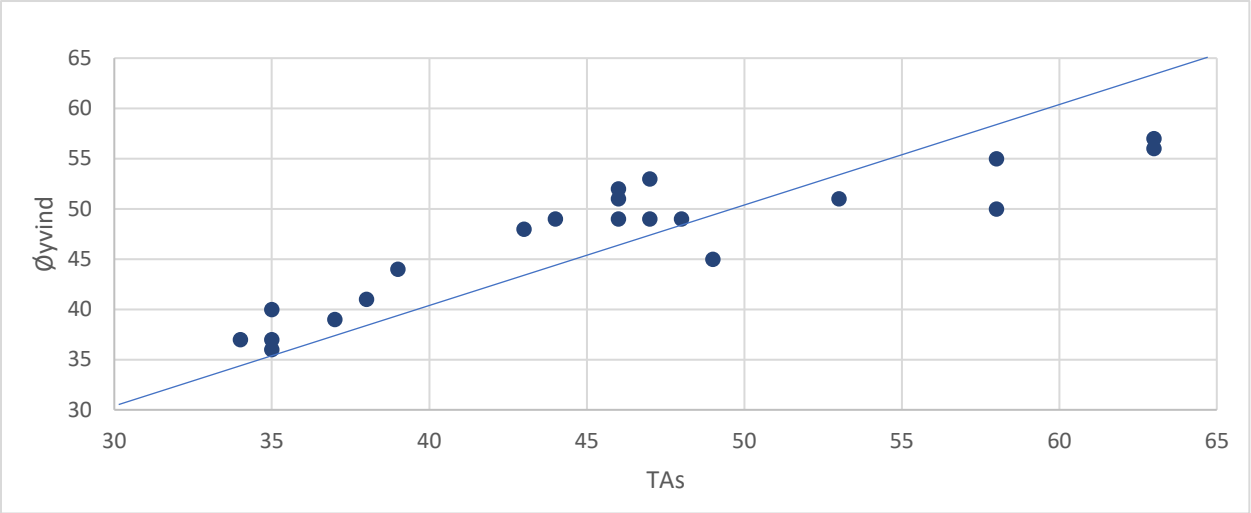
At this stage **each student that submitted a draft peer-reviewed two other student papers**. The peer-review was an element in the assignment – and consequently practically all students submitted drafts for feedback and peer-review. The peer review assessment followed a set of rubrics (Appendix 3) which also gave students immediate verbal feedback in the learning platform.

During the Poster day students presented their questions and results, and they got feedback from the audience and a score included in the assessment from the teachers. The assignment and rubrics are shown in Appendix 4.

The main assignment was the final IMRAD paper – after peer-review, written comments and discussions in the online sign-on sessions. See Appendix 5 for the assignment and rubrics.

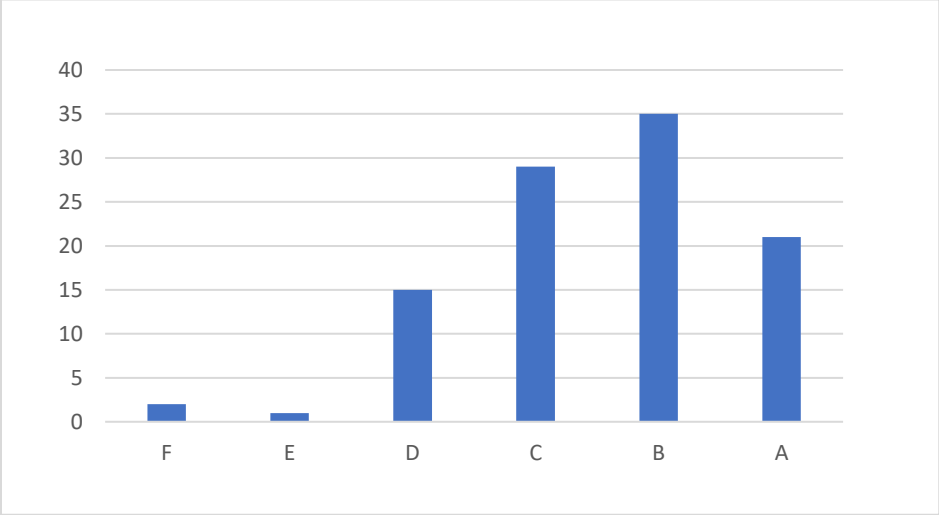
The scores in the final paper, the peer-reviews, and the presentations were summed to produce the final grade. **Before we set the final grade, we invited all students to sign up individually (with Appointment groups in early January) for a discussion around the scores.** More than 10% of the students participated in these final discussions, and they were very useful. Students pointed out where they did not understand the reason for their scores, and either this was explained, or the scores adjusted if this was reasonable. These talks were educational for both teachers and students – and we had no complaints on grades in 2021 or in 2020. This is quite unusual in a course with more than 100 students, and probably this final discussion is a key reason for that.

An interesting exercise we did was to compare the scores on the final reports between TAs and between Tas and the main teacher (Øyvind Fiksen). Here is the correlation where we overlapped our assessments:



This correlation is very good given the differences between the assignments in terms of topics, data and analysis they did in their papers. Also the average scores were very similar between TAs and TAs and teacher.

The final grading:



Constructive alignment in the course?

The main assessment products (paper, peer review, and the presentation) should motivate students to try to engage with the learning material presented in the modules and elsewhere, and to work constructively with their peers. It does take time to master all the elements in academic writing, and while the quality and efforts varied quite a bit between the groups – we saw many very good papers and presentations coming out of the course. Given the 5 ECTS (130 hours work in total) level of the course, our impression is that learning goals are met to a large extent.

Student evaluations

During the course we asked two groups with students from the Teachers programme to act as ombudsman – where other students could message anything to the teachers. We had no direct messages coming this way, but it was interesting to have some discussions on the course design with these students.

After the students had their final scores, we sent out an open anonymous evaluation form, and the students voices are listed in Attachment 6.

Improvements for the future

The integration of BIO300A and B improved a bit this year, but ideally the two courses should be one. Then the handling of data, statistical analysis and figures could be an integral part of BIO300B, and BIO300A could concentrate more on the writing part and all the needs master students have in order to succeed.

The course really needs good and motivated TAs (which has been the case the last years) and they all did an excellent job in commenting on texts and graphs and tutoring the students.

The goal of a course like this should be that students end up with concrete evidence of craft and skills such as a research paper and a poster they can add to their CV and show to future employers as examples of their competence. A closer collaboration with the student journal and a shift to pass-fail grading could be ends towards this goal. A pass-fail grade could involve a step-by-step feedback loop where the quality of the products has to reach a certain level before the course is passed.

Appendix 1. Course design - the front page of the course

Our first meeting is, as you see in the calendar, Monday 23rd of August at 14:15 in the Auditorium at VilVite!

The weekly seminars will be online, on Wednesdays 10:15 on Zoom. We plan to make this course fully online to ease the logistics of a course with all master students at BIO and because this is practical for a writing course - but you should of course meet in person with your group as much as you want.
In this course, you will write a short paper where you try to answer a simple research question. You find the question, some relevant data to plot and a result chapter with your group - and then write the other parts of the paper individually. Maybe the paper can be published in BIO's student journal Bikuben. This can be a valuable product on your CV.

Below is an overview of the main elements in the course. They appear through the semester, so you do not see all modules yet.

Learning activity	Type	Draft due	Feedback	Final due	Assessment	Weight
Find question & data	Group	September	Tutorials			
Write an introduction	Individual	Mid October	Peer review Tutorials, rubrics	Early Dec	Final paper	25%
Material and methods, figures & results	Group	Mid October	Peer review Tutorials, rubrics	Early Dec	Final paper	30%
Discussion, title & abstract	Individual		Tutorials, rubrics	Early Dec	Final paper	10%
Poster session	Group		Rubrics	Late Nov	Poster	15%
Peer review	Individual		Rubrics	Early Nov	Peer review	20%
Activity in the Modules			Tutorials, in class			

Here is the timeline of events, with hyperlinks to activities and assignments - and week numbers to approximate the timing:

August			Week 34 Course overview Module 1 Welcome Form groups, discuss plans & expectations	Week 35. Module 2 Practical info & IT. Cowrite and work with others. Find question for project.
September	Week 36 Module 3 Work on group project Find data for paper.	Week 37 Module 4. Library use. Hege Folkestad	Week 38 Module 5 Visualization & results Tom Langbehn	Week 39 Module 6 Materials and Methods Module 7 Writing Introductions.
October	Week 40 Modules 8 & 9.Writing a discussion. Academic writing.	Week 41 Module 10. Peer review - how science is made Academic writing	Week 42 (no seminar) Submit draft paper	Week 43 (no seminar)
November	Week 44 Module 11. How to succeed with your master Submit peer review.	Week 45 Comments & feedback on draft paper	Week 46 (no seminar) Comments & feedback on draft paper	Week 47 (no seminar) Module 12. Posters/oral presentations
December	Week 48 (no seminar)	Week 49 Submit final version of full report + discussion		JANUARY: Final grades back

Appendix 2. The peer review assignment

This is the instructions for writing the paper (see also the rubrics for the final assessment of the paper):

Here you can submit the first version of your paper, a title, abstract, introduction and the group section (materials and methods, results with maximum two figures). Submitting a draft version gives you a ticket to participate in the peer review process, which counts 20% of your grade, and a chance to receive feedback on your work from peer students, teaching assistants and teacher. The draft version itself is not subject to assessment - this is assessed by the final product, which will be a separate assignment.

Remember, this paper is a product you can refer to in your CV, or publish in a journal like Bikuben. if the quality is good.

The paper must be in a single Word document. The materials and methods and the results chapter with figures should be identical for everyone in the group.

General guidelines for the paper (see the modules for more details):

Introduction (individual): Make use of the standard ingredients in an introduction of a scientific research paper: An opening hook, introduce the background, carving out a research space, pointing out the knowledge gap, creating a transition to what can be done about it and what your concrete contribution will be - see the background material and the rubrics for details. Maximum word limit: 1000

Include reference to papers from the core literature and use a reference manager (like Endnote) to embed them in the Word document. Include a good title- maybe an engaging-informative type? Take care to use topic sentences, structure the paragraphs and craft the sentences for readability and style, as discussed in the modules. Write an abstract of maximum 100 words.

Materials and methods (Group). Maximum 500 words. Try to justify the selection of data, and explain how the data was collected, briefly.

Results (Group). Maximum 300 words + max. two Figures with captions that make it understandable as a standalone item (see modules). Tell a data-driven story with your visualization.

Discussion (Individual). Maximum 500 words.

Check the relevant modules and the rubrics in the assignment for further details about our expectations for structure, style and craft. We expect that you can apply at least some elements presented there - and you may even exceed our expectations and write at a level one could find in a decent scientific journal. And I repeat, you should aim to publish the paper in Bikuben, the student journal at BIO with your group, and build your CV.

You find a template with some general advice here.

All papers are sent for Plagiarism Review. Make sure you do not copy-paste anything from other texts. The individual sections must be written with your own words - with

no word-by-word overlap with other members of the group or the literature. Use your own words!

Write the paper in English.

Note that after the deadline, this assignment rubrics and score applies to your peer-review of two other papers, not your paper. You can obtain maximum 20 points out of 100 on the peer review. To see the rubrics for the paper itself - see the assignment for the final version of the paper.

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This is the instructions for performing the peer-reviews - which is assessed here:

The review assignment itself appears as a continuation of the draft submission. NB! We need some time to distribute the papers to reviewers and make sure that they are not given to students from the same group. We will notify you when we are ready! It may take some us hours, so wait for the signal..

The peer-review resembles the process in scientific journals - two independent (possibly anonymous) reviews and comments from teachers (editors).

First, write a short summary where you show that you have read the text, including your own interpretation of its results and main take-home message. Then, you may deal with some major issues, if you find any biases, errors or other weaknesses. Point out at least one thing you liked in the paper, and explain why. These elements can be written directly into the free-text form ('Add a comment'-box) in the peer-review submission assignment:

(picture of submission modus)

Download the file, make comments directly in the text, save it and attach the annotated file with the 'Attach file/legg ved fil' tag before submitting your review (see picture above). The comments you make in the file can point at style elements discussed in the modules of how to write the various sections of an IMRaD paper, and qualities of academic writing - words, sentences and paragraphs - as treated in Module 9. See also the rubrics below for a summary of important elements.

Your annotations can remain anonymous if you save the file as shown in the video below.

Appendix 3 The rubrics for the peer-review.

Due	For	Available from	Until
20 Oct 2021 at 12:00	Everyone	30 Aug 2021 at 9:00	21 Oct 2021 at 14:00

Rubric for review

Criteria	Ratings					Pts
Global edits Quality of suggestions for major revisions on the structure of the paper	**10 Pts** **Full score** The suggestions made can improve the paper substantially or points out why the existing structure works well with extensive references to the material in the modules. Comments are abundant, well justified and explained.	**7 Pts** **Good marks** Several valid suggestions and general comments made about the structure and content of the paper	**5 Pts** **Half score** Some useful comments about the structure of the paper and its parts, likely to improve the paper, or giving credits for some of the structure elements in an IMRAD paper	**3 Pts** **Some score** A few helpful comment or recommendations - but not likely to improve the commented paper much	**0 Pts** **No score** No suggestions or comments on the overall structure of the whole or parts	10 pts
Style and writing Quality of suggestions in writing	**10 Pts** **Full score** The suggestions made can improve the writing and flow of the paper substantially, and/or explains how or why the writing aligns well with the instructions in the modules. Comments are abundant, well justified and explained - and concrete about how and why the text use specific elements of good academic writing style.	**7 Pts** **Good marks** Several valid and concrete suggestions on the writing and flow of the paper - likely to improve the draft paper.	**5 Pts** **Half score** Some concrete comments on the writing, sentence structure, word use, use of active/passives, storytelling, graphs and visuals, flow etc. that help the author improve the paper	**3 Pts** **Some score** A few comments on writing, but not likely to improve the final version much.	**0 Pts** **No marks** No helpful comments or feedback	10 pts

Appendix 4. Assignment and rubrics for presentations and posters.

The oral presentation - group assignment Wednesday December 2nd

Publish

Here is the plan for the oral presentations on Wednesday December 2nd. This is the 'Poster day' at BIO, where several courses come together to present project work by students. In normal times we do this in the entrance area of HIB, but this year it runs online. We run our own session on Zoom, and we do oral presentations instead of posters. If a group wants to make a poster instead, we can arrange that, and place it in a session with the other courses - see this page for inspiration and information.

The format is a 3 min oral presentation, followed by 2 minutes for questions. This means you have to be structured and to the point with slides, animations, and timing. Pitch your work and question with a hook, a short introduction, what you did, what you found and what it means. Place a title and the list of authors on the first slide - we will roll a dice and this determines which of the authors on the list run the presentation. This means all authors must be prepared to share their screen and run the presentation. If any member of a group does not want to prioritize this activity and choose to not participate, let your group know, and your name should not appear on the list of authors on the presentation. You then miss all of the 40 points attainable.

We will make a detailed schedule for the presentations when we know the schedule of the Poster-symposium.

Upload the presentation here, as a Powerpoint file. You find the rubrics we use for assessment of the presentation below. We use the same main criteria for posters. The posters are part of a competition for a best poster award among all participating courses, so keep the criteria used there in mind also:

- This poster looks attractive and inviting.
- The title is clear and to the point.
- Headings are used to help effectively convey the main message.
- The text is effective and to the point.
- The research question or aim is easy to find.
- Figures and/or graphics effectively convey the main message.
- Creativity points for creative touch that strengthens the message:
- The poster contains these elements (one point per element): Contributors, Title, UiB logo, Text, Graphics (graphs, figures, etc).

Due	For	Available from	Until
1 Dec 2020 at 14:00	Everyone	16 Nov 2020 at 0:00	1 Dec 2020 at 15:00

Rubric for poster and oral presentation

Criteria	Ratings					Pts
Telling a story with a pitch	**5 Pts** **Full score** Introduces the purpose of the presentation clearly and creatively, smooth, clever transitions, information appear in a logical, interesting sequence. End with an accurate conclusion showing thoughtful, strong evaluation of the evidence presented.	**4 Pts** **High score**	**3 Pts** **Very good**	**2 Pts** **Good** Some of those elements are present	**0 Pts** **No score**	5 pts
Right level for audience	**5 Pts** **Full score** Level of presentation is appropriate for the audience. Original, clever, and creative elements that captures audience's attention	**4 Pts** **High score**	**3 Pts** **Very good**	**2 Pts** **Good** Some of those elements are present	**0 Pts** **No score**	5 pts
Use of visuals	**5 Pts** **Full score** Graphics, visuals, figures and text is animated appropriately to support the story, communication and attention to the audience	**4 Pts** **High score**	**3 Pts** **Very good**	**2 Pts** **Good** Some of those elements are present	**0 Pts** **No score**	5 pts
						Total points: 15

Appendix 5. The final IMRAD paper, assignment, and rubrics.

Final, revised paper

Published

Here you can submit the final version of your paper, including a title, an abstract, the revised introduction and the group project (materials and methods, results with maximum two figures), a discussion you wrote yourself, and a list of references.

The paper must be in a single Word document. The materials and methods, the figures and the results chapter should be identical for everyone in the group, the rest you write individually.

General guidelines - see the modules for more details:

Introduction (individual): Make use of the standard ingredients in an introduction of a scientific research paper: An opening hook, introduce the background, carving out a research space, pointing out the knowledge gap, creating a transition to what can be done about it and what your concrete contribution will be - see the background material and the rubrics for details. Maximum word limit: 1000

Include references to several papers from the core literature, and use a reference manager (like Endnote) to embed them in the Word document. Include a good title- maybe an engaging-informative type? Take care to use topic sentences, structure the paragraphs and craft the sentences for readability and style, as discussed in the modules. Write an abstract of maximum 100 words.

Materials and methods (Group). Maximum 500 words.

Results (Group). Maximum 300 words + max. two Figures with captions that make it understandable as a standalone item (see modules).

Discussion (Individual). Maximum 500 words.

Check the relevant modules and the rubrics in the assignment for further details about our expectations for structure, style and craft. We expect that you can apply at least some elements presented there - but feel free to exceed our expectations and bring it to at a level one could find in a decent scientific journal. You should then coauthor a final version with your group and submit it to Bikuben when you are done.

You find a template with some general advice here .

All papers are sent for Plagiarism Review. Make sure you do not copy-paste anything from other texts. The individual sections must be written with your own words - with no word-by-word overlap with other members of the group or the literature.

Write the paper in English.

Rubrics for paper 2021

Criteria	Ratings						Pts
Title & abstract The title is descriptive of the study, and summarize the main point in an engaging and understandable statement. The abstract follow the general advice given for the structure, and it tells a coherent and readable story. threshold: 1.0 pts	2 Pts Excellent	1 Pts Good	0 Pts No description				2 pts
Intro - write a theme into a scientific context, with critical use of core scientific literature The introduction use the classical structure for IMRaD, have a good opening and hook, carves out the research space, builds in the background, narrows down to a researchable question, becomes more specific in the end. Language is clear, active and efficient. Sentences, paragraphs and the introduction itself has a natural flow and presents an interesting, well justified and referenced story. threshold: 15.0 pts	25 Pts Excellent	20 Pts Very good	15 Pts Good	10 Pts Fair	5 Pts Weak	0 Pts Fail	25 pts
Material and Methods The methods is described clearly and in sufficient detail, well written, making it possible to repeat the study and analysis you present, and at the same time readable to peers. The MM section follows advice presented in the modules, and has a logical structure leading from question to how answers can be found. threshold: 5.0 pts	10 Pts Excellent	8 Pts Very good	6 Pts Good	4 Pts Fair	2 Pts Weak	0 Pts Fail	10 pts
Figures - present results and data and write them into a text Figures can be read independently (clear caption), are easy and intuitive to interpret, follow general rules for good visualization of data, tell a story, can be reproduced with code, answer a research question. threshold: 5.0 pts	10 Pts Excellent	8 Pts Very good	6 Pts Good	4 Pts Fair	2 Pts Weak	0 Pts Fail	10 pts
Results Results are presented concisely and honest, figures and data-analysis is seamlessly embedded in the text, the text highlight the main points and separate discussion from description of findings, original findings, test the hypothesis threshold: 5.0 pts	10 Pts Excellent	8 Pts Very good	6 Pts Good	4 Pts Fair	2 Pts Weak	0 Pts No description	10 pts
Discussion The discussion summarize and interpret the results, point out caveats, relate findings to the literature, highlight implications, suggest future work, is in harmony with the introduction, pick up on the research question threshold: 5.0 pts	8 Pts Excellent	7 Pts Very good	6 Pts Good	4 Pts Fair	2 Pts Weak	0 Pts No description	8 pts
							Total points: 65

Appendix 6. Student evaluations

Elements and learning activities that improved my skills - things to keep	**Things that should be left out, changed or improved - things to trash**	**What do you need to learn at the start of a Master project, or to become better at writing and communicating your work to others? What would an ideal course to train this contain and how should it be designed?**	**The course was fully online - partly due to Covid, but also an interesting experiment. Should we keep the fully digital format, or which parts should be kept digital? Or not?**
The zoom meetings recorded, was very useful to be able to re-listen to parts. The professor is great and very engaging. The TAs are very helpful aswell. Really useful that we can book time with you all and discuss this was very helpful. Love that this is one of the few courses that trust students to manage their time correctly. There are so many students with different timetables that this course was perfect because it allowed us to schedule time fitting our group. Book recommendation was great	Slightly dissapointed that we were graded on our presentation and not our poster. This should be made clear earlier on then we would have choosen presentation so we had more minutes. There was no reason to use many hours on the poster then.	For us with Norwegian as a first language the academic English can sometimes be difficult. would have loved therefore to see som epraactical tips and more, perhaps recommendations of papaers where that is excellent for learning. I also have the awkward question of how long should a master thesis be ? Because the paper we write has very strict word limit.	Yes, but also keep the poster session as a meeting point. That should be more integreted into the course. would have dropped the presentation part and had everyone meet at the poster and where all group members should have one representative which was switched around so everyone could look at other peoples poster. It was a bit sad that not everyone used the poster session to discuss their research because it was really intresting.

The peer-review and presentation were fun and educational. It was interesting to see, how other people write and structure their papers. Getting feedback on my own work was also interesting. It helped me structure my paper better, pointed out things that needed to be clearer and things that needed to be better explained.

Writing a good introduction is very important and I am glad I got this experience before starting my master thesis.

It would be nice if the appointments with you and the TA´s were in person. In my group we felt lost for a long time and we didn´t feel like the appointments helped, we were usually more confused after a meeting than before.

Evalueringsrapport - BIO316 vår 2021

Innhold og gjennomføring

Våren 2021 hadde BIO316 10 påmeldte studenter. Studentene hadde ulik bakgrunn, fra ferske masterstudenter til erfarne PhD-studenter, med fagbakgrunn fra ulike masterprogrammer i biologi, molekylærbiologi og kjemi. Dette semesteret ble igjen preget av COVID-19 pandemien, med noen fysiske forelesninger i starten før vi måtte gå over til digitale forelesninger i en periode, og senere hybride løsninger ettersom noen studenter foretrakk å følge forelesningene på zoom eller var forhindret fra å komme til Bergen pga reiserestriksjoner. En utvekslingsstudent fra Hellas måtte følge hele kurset via zoom. På grunn av korona-restriksjonene ble også studentworkshopen som var planlagt på Espegrend med overnatting flyttet til Marineholmen og overnatting ble droppet. Også denne var det enkelte studenter som måtte følge via zoom.

Kurset var delt inn i tre moduler med følgende innhold:

Module 1: Lectures & seminars

1. (27.1.2021) Course introduction & plan, general concepts of environmental toxicology (Anders Goksøyr)
2. (17.2.2021) Exploring target systems and mechanisms of action, lecture (Marta Eide)
3. (24.2.2021) Endocrine disrupting compounds and chemicals of emerging concern (Anders)
4. (3.3.2021) Toxicological aspects of oil and produced water (Jasmine Nahrgang/Bjørn Henrik Hansen)
5. (7.4.2021) Emerging contaminant risks: Environmental biomonitoring of CECs (Daniela Pampanin/Daniel Schlenk, Magne O Sydnes)
6. (21.4.2021) Microplastic workshop debrief (Anders/Alexander/Tanja)
8. (5.5.2021) Wrap-up. Course summary and evaluation (Anders)

Module 2: Journal clubs

Journal club 1 (Topics from textbook chapters, individual/group work) – presentations (3.2.2021 +) 10.2.2021
Journal club 2 (Scientific articles, group presentations) – presentations 17.3.2021 (+ 24.3.2021)

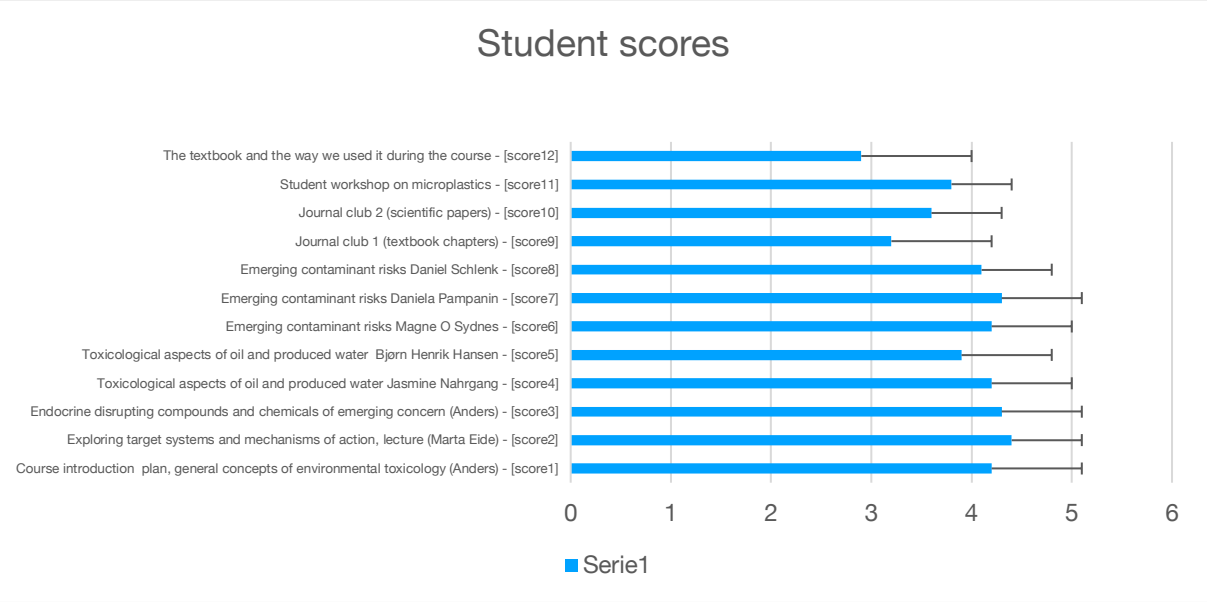
Module 3: Student workshop

Topic: Micro- and nanoplastics – sources, toxicity, solutions: knowledge and research challenges
Two-day workshop led by Tanja Kögel, Amy Lusher, Alexander K Madsen, (Marte Haave)
Wednesday April 14 (09.00) – Thursday April 15 (16.00) ~~at Espegrend Marine Station, including meals and overnight stay in dormitory~~ at Biologen, T53B, Marineholmen.

Reading list

Introduction to Environmental Toxicology - Molecular Substructures to Ecological Landscapes, Fifth Edition by Wayne G. Landis, Ruth M. Sofield, Ming-Ho Yu, CRC Press 2018, ISBN-13: 978-1-4987-5042-4 (Hardback).

Additional papers and book chapters will be selected from the recent literature in the field to be presented and discussed by students and lecturers.
Etter kurset ble det gjennomført en evaluering der studentene ble bedt om å svare på spørsmålene vist i vedlegg 1 (Evaluation questionnaire). Svarene er samlet i vedlegg 2 og fremstilt grafisk i figur 1.



Figur 1. Samlefigur fra studentevalueringens spørsmål 4 (gjennomsnitt ± standardavvik)

Egenevaluering

Koronapandemien gjorde det naturlig nok noe krevende å måtte veksle mellom digitale løsninger og fysisk tilstedeværelse, selv om vi også fikk trening i dette i 2020 (men da hadde vi bare 4 studenter). Den hybride zoom-løsningen med et ekstra web-kamera og bruk av breakout rooms fungerte stort sett bra, også når vi hadde inviterte foredragsholdere som deltok via zoom. Det ser ut som studentene er enige med oss her.

Det som manglet var en god mikrofon som kunne fange opp spørsmål og kommentarer fra forsamlingen, siden det ikke var lett å flytte vår lille Jabra mikrofon rundt tidsnok alltid. Dette er også noe studentene kommenterer på.

Sammensetningen av egne og inviterte ekspertforelesere i seminarer fungerte også godt. Noen av forelesningene kunne kanskje bli litt lange slik at det ble mindre tid til å involvere studentene i diskusjoner, men generelt var tilbakemeldingene gode fra studentene på denne delen.

I modul 2 hadde vi to såkalte Journal Clubs med studentforberedte presentasjoner. I Journal Club 1 var intensjonen å få studentene (i grupper à to studenter) til å fordype seg i hvert sitt kapittel i læreboken og prøve å formidle essensielle aspekter fra hvert kapittel. Det kommer tydelig frem at studentene hadde problemer med dette formatet. De følte både at de fikk kort tid (14 dager) og at stresset med å fokusere på egen presentasjon gjorde det vanskelig å følge med på de andre gruppenes presentasjoner. Utbyttet av dette ble nok ikke som planlagt, og opplegget for Journal Club 1 bør vurderes lagt om til neste år. Journal Club 2

handlet om å presentere en vitenskapelig artikkel og ble nok tatt bedre i mot av studentene, selv om noe av stresset med egen presentasjon nok tok vekk noe av evnen til å følge med på andre presentasjoner også her.

Modul 3 var en studentworkshop over to dager som var planlagt lagt til Espegrend Marinbiologiske Stasjon, men som ble flyttet til BIOs lokaler på Marineholmen på grunn av innstramminger i forbindelse med pandemien. Dermed ble det ikke noen overnatting med felles matlaging osv, men to normale dager med foredrag, presentasjoner, litt feltarbeid i nærområdet og litt lab. Felles lunsj og pizza etter dag 1 ble det riktignok. Vår ene instruktør (Amy Lusher) måtte følge workshopen og instruere labøvelsene via zoom fra Oslo på grunn av reiserestriksjoner, og Marte Haave, som skulle delta i feltarbeidet ble syk. Dermed ble opplegget veldig amputert og ikke helt slik det opprinnelig var planlagt. Et detaljert program finnes i vedlegg 3.

Vi gjennomførte en egen debrief av modul 3 med studentene uken etterpå, og fikk mange gode tilbakemeldinger som ikke kommer frem av svarene i evalueringsskjemaet. Disse gikk blant annet på verdien av felt- og lab-delen, som vi er enige i ikke fungerte optimalt, men som i stor grad kan forklares med uforutsette omstendigheter, og gruppearbeidet med kritisk lesning og presentasjoner, der studentene mente det ble for mye å lese og forberede på litt for kort tid. Dette er vi også enige i. Igjen ble stresset med fokus på egen presentasjon som en distraksjon i forhold til å oppfatte hva de andre gruppene presenterte fremhevet. Dette er åpenbart et tema vi må ta tak i når vi gir denne typen oppgaver. Kanskje det er en idé å gi studentene i oppdrag å vurdere hverandre, slik vi gjorde i Journal club 2? Da er de nødt til å følge med og legge merke til hva som blir sagt og hvordan det blir fremført. Dermed blir det klarer for studentene at det å følge med på andre presentasjoner er en del av forventningene til dem. Samtidig blir erfaring med kollegavurdering en del av læringsutbyttet.

Studentene ble også bedt om å lage en kort reportasje med tekst og bilder fra workshopen. Disse ble samlet og publisert på BIOs nettsider og på Plastnettverkets sider: https://www.uib.no/bio/145103/biologistudenter-unders%C3%B8ker-mikroplast-p%C3%A5-marineholmen. Dette bidro også til erfaring med formidling som en del av læringsutbyttet.

Læreboken er nok det elementet som fikk størst kritikk i studentevalueringen. Dette gjelder kanskje spesielt måten vi ba studentene presentere den på i Journal Club 1, siden flere uttrykker positive kommentarer til det å ha en lærebok tilgjengelig som en felles tråd gjennom hele kurset. Uansett kan det være en idé å se seg om etter en ny lærebok på feltet, evt en samling av kapitler eller oversiktsartikler knyttet til temaene vi vil ta opp.

Vedlegg 1.

Student questionnaire

1. Hvilke forventninger hadde du til kurset, mtp tema, innhold og aktiviteter, og hvordan opplevde du at kurset sto i forhold til dine forventninger?

What expectations did you have to this course, with regards to topics, content and activities, and how did you feel the course met your expectations?

2. Les læringsutbyttebeskrivelsen for studieretningen i miljøtoksikologi her:
http://www.uib.no/studieprogram/MAMN-BIO/MILJ#uib-tabs-kva-larer-eg
Hvordan synes du årets BIO316 har bidratt til at du skal nå dette læringsutbyttet?

Read the learning outcome description of the environmental toxicology master program here: https://www.uib.no/en/studies/MAMN-BIO/MILJ#uib-tabs-what-you-learn

How do you think this year's BIO316 contributed to your reaching this learning outcome?

3. Hvor fornøyd/misfornøyd er du med organiseringen av kurset (med lærebok, leseliste, seminarer, presentasjoner og studentworkshop)? Kommenter gjerne svaret ditt.

How satisified/dissatisfied are you with the organization of the course (textbook, reading list, seminars, presentations, and student workshop)? Please comment.

4. Gi en score på følgende aktiviteter (fra 1-dårlig til 5-veldig bra):

Give a score to the following activities (from 1 – bad to 5 – very good)

Modul 1
1. Course introduction & plan, general concepts of environmental toxicology (Anders)
2. Exploring target systems and mechanisms of action, lecture (Marta Eide)
3. Endocrine disrupting compounds and chemicals of emerging concern (Anders)
4. Toxicological aspects of oil and produced water
   Jasmine Nahrgang
   Bjørn Henrik Hansen
5. Emerging contaminant risks: Environmental biomonitoring of pharmaceuticals
   Magne O Sydnes
   Daniela Pampanin
   Daniel Schlenk

Modul 2
Journal club 1 (textbook chapters)
Journal club 2 (scientific papers)

Modul 3
Student workshop on microplastics

Læreboken og måten læreboken ble brukt på i kurset:
The textbook and the way we used it during the course:

5. Hvordan synes du vi håndterte koronasituasjonen? Følte du deg trygg de gangene du deltok fysisk? Følte du deg involvert de gangene du deltok digitalt?

How do you think we handled the corona situation? Did you feel safe when you had a physical attendance? Did you feel involved when you participated digitally?

6. Kommenter svarene dine/*Please comment your answers*

160707: What expectations did you have to this course, with regards to topics, content and activities, and how did you feel the course met your expectations?
I expected the course to give an overview of different topics in environmental toxicology. I think the course went beyond my expectations. I was mostly concerned with being introduced to the topics, but there was a good amount if interaction. Also was not expecting to have any guest lecturers, but am glad they were there, and provided an interesting way of learning the course. I think the mandatory activities matched with my expectations. I knew there would be some mandatory presentations and assigments that would be mostly for our own learning. I think the course matched this quite well.
Var litt usikker på temaer som ville bli gjennomgått i emnet annet enn at det handlet om toksikologi, og at vi ville gå gjennom teori og aktuelle metoder. Når det gjelder aktiviteter var jeg også litt usikker i hvilken grad skulle være forelesninger i forhold til diskusjoner og presentasjoner. Siden jeg ikke hadde så mange forventninger er det vanskelig å si i hvilken grad mine forventninger ble møtt annet enn at jeg følte vi lærte mye interessant om toksikologi
Expectations: a wide range of topics. The seminars, the journal clubs and the workshop presents many different topics, so my expectations were absolutely met. The experts giving lectures was especially appreciated.
I expected this course to be quite similar to what I have experienced it to be. I like the groupwork where everyone had to contribute and then discuss afterwards. The topics were relevant and interesting.
Jeg har aldri hatt et slikt åpent kurs før og stilte derfor uten noen spesielle forventninger. Ettersom faget heter utvalgte emner i toksikologi tenkte jeg at her får jeg sikkert et godt overblikk over faget noe jeg også syns jeg fikk.
Going in to this course, my expectations were somewhat general; I expected to learn more on different toxicology topics that are currently discussed such as bioaccumulation/bioconcentration and biomagnification as well as emerging contaminants (microplastics, pharmaceuticals etc). The activites were quite interesting, the fact that students were constantly urged to be pro-active and participate was regarded positively. The course generally did meet my expections, although I would have liked to discuss biomagnification and its effects on the public health.
Jeg tok BIO341: Utvalgte emner i biodiversitet i høst, og tenkte derfor at Utvalgte emner i miljøtoksikologi ville være ganske likt, sånn i form, og det var det ikke. I BIO341 leste vi masse artikler, mange litt mer populærvitenskapelige artikler, om tema som er litt "i vinden" innenfor dette fagfeltet. Jeg opplevde at BIO316 ikke helt svarte på de forventningene jeg hadde. Det har nok en sammenheng med at mange i BIO316 ikke har lært mye om miljøtoksikologi før, noe som gjør at man må bruke litt tid på å lære alle det grunnleggende før man kan diskutere de mer spesielle tilfellene. Men jeg synes for eksempel det vi lære om waste water treatment plants og det med renseannlegg var veldig spennende, og jeg håpte egentlig at hele kurset skulle være mer basert på slike ting: mer se på de relevante og konkrete problemene som fins med forurensing rundt omkring i verden, og ikke liksom gjennomgå de konkrete faktaene i fagfeltet. Jeg håpet at det skulle være på plass, og at dette faget kunne ha en diskujon på en måte hvor kunnskapen ligger i bånn, og man kan diskutere tema på bakgrunn av den kunnskapen man allerede har
I did not have any expectations of the course in terms of content. Environmental toxicology is a topic I was broadly interested in and I decided to take the course as an elective (not required). I think my knowledge has been expanded greatly and in that sense it was a success. The other aspect of the course is concerned with training students to be scientists. I wasn't expecting the level of critical analysis work, it was fine but not as beneficial to me who has more experience than most.
Jeg hadde ikke noe forventninger til emnet. Emnet tok opp flere interesante tema, hvor flere ga meg ting å tenke på i henhold til miljøutfordringer.
I feel my course filled my expectations because I learned many new things in the environmental toxicology topic and the presentations and practical activities I believe helped a lot in gaining knowledge.

160709: Read the learning outcome description of the environmental toxicology master program here: https://www.uib.no/en/studies/MAMN-BIO/MILJ#uib-tabs-what-you-learn **How do you think this year's BIO316 contributed to your reaching this learning outcome?**
The way the course was structured helped me reach the goals. I think the most important parts were student interactions. It was expected that we were prepared for the course, and had done our "homework". I think that helps a lot, instead of just listening to lectures. Also interacting with us and asking us to discuss really helped on our learning I thought. The microplastics seminar in particular was a good way for us to get practical knowledge and not just theory based learning.
Jeg føler emnet har gitt gitt meg bedre kunnskap om miljøtoksikologi. Gjennomgang av forskningsartikler har gitt en mer innblikk i hvordan man selv skal utføre et forskningsprosjekt og hvordan man tolke og diskutere resultat. Gruppearbeid har også gitt trening i å jobbe med andre. Jeg føler også jeg har fått mer erfaring i å diskutere temaer med andre.
This years BIO316 contributes well towards the learning outcomes of the environmental toxicology master program. Especally for general competence; presentations and discussion.
Ja, jeg mener at BIO316 har bidratt til en større forståelse om temaene i læringsmålene. Diskusjonene der alle bidrar fungerer veldig bra for læring, etter min mening. Spesielt når det kommer til grunnleggende prinsipper, som man vanligvis bare leser seg i gjennom. Å få eksterne forelesere til å holde presentasjon gjør læringen også spennende. Føler at vi får en bredere forståelse når folk forteller om egne erfaringer
Jeg syns at BI316 i år oppnådde læringsmålene ganske godt. Vi gikk gjennom et bredt spekter av toksikologi der vi både hadde forelesninger om de forskjellige temaene samt at vi selv fikk jobbe med dem i form av blant annet presentasjoner. Mikroplastikk workshoppen ga også muligheten til litt lab arbeid som var fint.
It says that "the student will have in-depth knowledge about current topics in toxicology, ecotoxicology, and environmental toxicology. The student will be familiar with the most recent research in the field" and I believe this goal was successfully accomplished. We worked on many research articles as well as a workshop, discussing important toxicology and envrionmental toxicology issues such as pollution in the arctic area and microplastics. Personally I found that these two topics were the most interesting and up-to-date and I learned a lot on the matter.
* Handle, and present quantitative data, and evaluate confidence to conclusions by use of basic statistical principles - kan ikke si jeg opplevde å lære så mye av dette? * Present, oral and written, scientific results based on analysis, in the context of existing research results also to non-specialists - vi hadde ganske lite skriftlig arbeid? Jeg har hørt at dere tidligere i BIO316 har jobbet med å skrive litt mer populærvitenskapelige tekster om miljøtoks, det hadde vært

Knowledge, Skills, and General Competence are the three areas outlined in the learning outcomes. My answer here is someone repeating my previous answer, but I will be more specific and strictly discuss my own experience. Knowledge: the course greatly increased my knowledge of the topic, but if it were up to me I would prefer even more knowledge based learning over the skills building because I still lack some knowledge. e.g. I don't have a good mechanistic/chemical understanding of how toxicants effect biology/physiology. Skills: The microplastic workshop was helpful in introducing us to some of the skills needed, but to truly build skills we would need a dedicated laboratory component. General Competence: I had some good practice in analysis, discussion, and presentation. I already have good confidence in this area but practice is appreciated.
Emnet har hjulpet meg til å nå målene på en grei måte
I believe BIO316 covered all the topics, but I would add maybe more practical activities or lectures on the methods

160710: How satisified/dissatisfied are you with the organization of the course (textbook, reading list, seminars, presentations, and student workshop)? Please comment.
I was very satisfied with the organization of the course as a whole. The textbook was okay. It is a great supplement, but will admit it was at times hard to comprehend, while at other times it was relatively easy. The reading list was at times a bit too long, when considering that other courses also have to be factured into our time. For instance, having to read three chapters at the beginning of the course prooved difficult since we also had to get the book. And the reading list for the microplastics course was quite large. But there were other times when the reading list was just fine, with 1-2 chapters or a few research papers. I felt the seminar went okay. I was not able to attend physically so could not participate in a lot. However, i felt mostly included in the seminar. Escept for the sampling, and partially the lab as I could not really see what was going on at times. I am very satisfied with the presentations and also the student workshops.
Jeg er ganske fornøyd med organiseringen av dette emnet. Når det gjelder ting vi skal ha lest før forelesning har det til tider vært mye uten at jeg føler vi har fått brukt det vi har lest. Når det gjelder studentverkstedet i mikroplast var det noen ting som kanskje kunne vært bedre organisert, men jeg forstår at det ble en del endringer siden vi ikke skulle til Espegrend.
In general: satisfied. The corona restrictions made "everything" more difficult, but I believe the course was organised well nevertheless. The textbook and reading list worked well. The organisation of the student workshop was not the best. However, this was a result of the corona restrictions and status at the time. The lecture after the workshop gave a nice discussion on this topic. The journal clubs (presentations) were extra challenging because of digital presentations and collaborations digitally.
Personlig syns jeg at det var litt vel mange artikler å pløye igjennom før seminarene (noen ganger). Men på en annen side er det greit å sette noen krav til forberedelse, slik at man kommer med litt forkunnskaper. Føler at man lærer mer da og det blir enklere å følge med. Jeg syns det var greit å ha en pensumbok å forholde seg. Det var greit å kunne ha noe å slå opp i dersom man lurer på noe. Hvis man søker opp på nettet kan stå så mange varierte/annerledes definisjoner og forklaringer :) Presentasjon-delen var ok. Det er alltid greit å øve seg på å presentere! Men dersom hensikten er å lære fra medstudenter syns jeg ikke det er den beste metoden.. For det ender som regel opp med at man stresser mer med sin egen presentasjon fremfor å følge med på andres.
Generelt sett er jeg fornøyd. Jeg tror derimot det finnes andre bøker som kan være litt greiere å bruke. Boken som ble brukt virket litt utdatert og til tider litt vanskelig og tung å lese. Ikke et stort problem men tror det kan hjelpe på faget å bytte ut boken med en annen.
I found the organization quite nicely done, the fact that students were encourged to participate in seminars really helps anchor the knowledge that's been acquired. The presentations as well as the workshop were a nice touch added to improve learling and making it more efficient and pleasent. However the preparation for the seminars and the workshop was deemed to be a bit "heavy"; given that this is a 5 cp class, the tasks that were demanded to complete prior the seminars are less to be desired, as they put a toll on the students, especially since that they have other school work and assignments
Det var ofte litt mye å lese. Tekstboken var OK, men mye repetisjon fra BIO216. Det kan jeg jo forstå at de som tar BIO216 setter pris på - digg når man går igjennom de samme tingene i 2 fag, da er det lettere å lære, men det er vel egentlig ikke poenget til forelesere? Men forstår også at det er vanskelig å gjøre det på en annen måte når de fleste ikke har hatt BIO216 før de har BIO316. Plastic workshop - skulle ønske den kunne vært gjennomført som planlagt, det hadde nok vært kjekt! Synes dere gjorde en bra jobb, til tross for kjipe regler. Synes det var nice at det også var lagt opp til å spise både lunsj og middag (den ene dagen) sammen. Det tror jeg gir litt samhold til gjengen, noe som er ekstra viktig i år kanskje.

I was dissatisfied with the part of the course in which we went through the text book. I did not think the text was well organized or well written. I understand that there may be limited options for this field. So, if a good text is not available then I would prefer detail lectures from the instructor (perhaps in a recorded, digital format) and accompanying readings from the literature. I also was dissatisfied with the Journal Club 1 because I found it difficult to split my attention between my own presentation and others, and so I did not read through the material as closely as I would have liked. The later part of the course was much more satisfying. I enjoyed the seminars, discussions, and the workshops. They kept me engaged and I believe I learned a lot. However, some of the papers were beyond my technical competence and it made it difficult to read them and analyze them. Sometimes there were too many papers to read and papers were added to the reading list the day before class. It was hard to keep up with those, and it was discouraging when articles were not discussed or when the lecture was a repetition of the paper.
Det var greit organisert, men kanskje litt vel mye å skulle ha lest til første forelesning og til plastworkshoppen
I am satisfied, only when it comes to the articles that were suggested for reading I believe we should have more time to work on them.

160737: How do you think we handled the corona situation? Did you feel safe when you had a physical attendance? Did you feel involved when you participated digitally?
I felt safe attending physical lectures. Am glad we had the option of not attending if we did not feel safe attending. However, I think it would be better if we had booked K3/K4 instead of the small seminar room throughout the course. Since it is a much bigger room and easier to keep our distance. I felt somewhat less involved when attending digitally, but I think the situation was solved wuite well. It is just that the interactions are different when through a screen.
Jeg synes dere håndterte koronasituasjonen bra, og følte meg alltid trygg ved fysisk oppmøte. Når det gjelder digital undervisning synes jeg den også fungerte bra, selv om det kunne bli litt rotete nå noen var på zoom og andre møte opp fysisk, som under studentverkstedet i mikroplast.
It was not communicated well enough if the attendance had to be physical or not. I felt safe at physical attendances, however I did feel that some of the physical appearances could have been switched with digital ones. The break out rooms for participation digitally worked very well.
Ja, det føltes helt trygt å møte opp til seminar på skolen.
Jeg følte meg trygg i forelesningene og syns corona situasjonen ble håndtert godt. Digital forelesning er alltid vanskelig mens syns at det ble gjort på en god måte ved at vi fikk konkrete ting som måtte diskuteres i breakout rooms. Syns også det var lettere å prate på zoom når alle hadde kamera på. Det ga litt mer en følelse av å være i et klasserom enn når en bare snakker til masse svarte skjermer.
I would say at first I felt safe going into a physical leacture, however when the corona situation worsened around the workshop time, it was a bit scary to attend physically and I think many of my classmates shared the same concerns. Nevertheless, I think the situation was handled pretty well. We had a mixutre of both digital and physical lectures, which made learning more interesting, especially after sitting in front of a computer for months.
Det har vært vanskelig å henge med digitalt, spesielt når dere møtes fysisk. Det er ofte vanskelig å få med seg det folk sier i klasserommet når man ikke er flink til å flytte mikrofonen rundt. Men jeg forstår også at det er vanskelig å alltid huske på de som er på zoom. Alt i alt synes jeg det har gått greit, jeg er aller mest bare veldig takknemlig for å ha fått lov til å gjennomføre kurset til tross for at jeg ikke har vært i Bergen dette semesteret!
The general challenge with the corona situation is that everyone has a different risk evaluation to make. So, it was helpful that Anders was flexible with the course logistics and I was able to follow my own risk calculation and feel safe. The fully digital lectures worked surprisingly well. Anders was adept at technical aspects and the structure of breakout rooms followed by group input led to good discussion and engagement. The hybrid classes were more difficult to manage with some people present physically and some virtually. The discussions did not flow as well. I think some of that could be solved with better equipment/technology. It was often difficult to hear and see the students that were physically in the class room while attending digitally.
Jeg følte meg involvert når jeg deltok digitalt. Jeg følte meg litt usikker til tider når det var fysisk oppmøte, men det var for så vidt godt å komme seg litt ut av huset. Dere håndterte koronasituasjonen ganske greit til tross for at det kom mange endringer over nokså korte perioder
I believe the corona situation was handled very well as it was possible for even those who did not participate to attend the workshop and the measures taken for those who participated were adequate in order to prevent the spreading of the virus

160739: Please comment your answers.
My answers are on the course in general. I am quite happy with the course overall.
?
No additional comments :)
Alt i alt, føler jeg BIO316 har vært et veldig interresant fag. For min egen del var det kun en fordel at det 'overlappet' litt med pensum i BIO216
Jeg har ikke mer å tilføye til svarene mine. Fornøyd med faget.
I based my answers on my impressions that I had on this course. Given that I attended all lectures, I felt entitled to give solid answers to the questions in this survey.
Overall I'm glad I took this course, thank you very much.
Har ingenting å tilføye
I am generally very satisfied with the course and I believe there might be some ideas in my comments as we also discussed that could improve it even

BIO316 Student workshop April 14-15, 2021

Location: Institutt for biovitenskap (BIO), Thormøhlensgt. 53 B, seminar room K3/K4 and large laboratory B NG07, Bergen

(B-block, first floor, first laboratory to the right on the way to the seminar room K3/K4)

Map: https://www.uib.no/bio/kart

Time: Wednesday April 14 – Thursday April 15, 2021

Contents

Student workshop on microplastics

Organizers: Tanja Kögel, Amy Lusher, Marte Haave and Alexander Klevedal Madsen

Guests: Peter Homkvist, Avinor Flesland

Details

Uncontrolled plastic waste is a major global issue, reaching the environment at escalating levels with potential far reaching consequences. Microplastics form a part of the global plastic pollution. To what extent do microplastics accumulate and harm the ecosystem, including those species that ingest them?

During this two-day workshop, we aim to provide an overview over the *status quo* of microplastics in the environment, regarding distribution, uptake by animals and effects. We will cover plastic polymer chemistry, environmental sampling and analytical methods, interactions by and effects on organisms, and the need for environmental and human health risk assessments.

The workshop will consist of some lectures from UiB's researchers working on plastic pollution whilst emphasizing work in flipped classroom approaches. Students will work on a topic and then present what they learned to their peers, stimulating critical thinking. There will also be an excursion into the surroundings of the Institute, which includes an urban waterfront, to observe microplastics contamination and collect some samples, isolate, and chemically identify them.

Schedule

Before course, complete Task and 2:

Task 1

Read the three review articles and try to grasp the authors' intentions:

What are the main take-home messages of the different papers?

Do you find differences in the scope of the papers?

What more do you think is important in this field of research?

Microplastic review articles for preparation

- Article 1: Cole et al., 2011

- Article 2: Lusher et al., 2020
- Article 3: Kögel et al., 2020 + supplements

Task 2

Read (scan) the following six papers.

- Paper 1: A. Bour, A. Haarr, et al., Environmentally relevant microplastic exposure affects sediment-dwelling bivalves, Environmental Pollution, 236 (2018) 652-660.
- Paper 2: I. L. N. Brate, M. Blazquez, et al., Weathering impacts the uptake of polyethylene microparticles from toothpaste in Mediterranean mussels (M-galloprovincialis), Science of the Total Environment, 626 (2018) 1310-1318.
- Paper 3: A. Dawson, W. Huston, et al., Uptake and Depuration Kinetics Influence Microplastic Bioaccumulation and Toxicity in Antarctic Krill (Euphausia superba), Environmental Science & Technology, 52 5 (2018) 3195-3201.
- Paper 4: Scherer, C., Wolf, R., Völker, J., Stock, F., Brennhold, N., Reifferscheid, G. and Wagner, M., 2020. Toxicity of microplastics and natural particles in the freshwater dipteran Chironomus riparius: Same same but different?. Science of the Total Environment, 711, p.134604.
- Paper 5: Deng, Y., Zhang, Y., Lemos, B. and Ren, H., 2017. Tissue accumulation of microplastics in mice and biomarker responses suggest widespread health risks of exposure. Scientific reports, 7(1), pp.1-10.
- Paper 6: Mattsson, K., Johnson, E.V., Malmendal, A., Linse, S., Hansson, L.A. and Cedervall, T., 2017. Brain damage and behavioural disorders in fish induced by plastic nanoparticles delivered through the food chain. Scientific reports, 7(1), pp.1-7.

Students are distributed into three pre-made discussion groups (3-4 students per group) on MittUiB for the workshop.

Read the two assigned papers individually and critically.

Note flaws and highlights of the papers for day 2 of the workshop.

Day 1 Wednesday

9:00 Arrival, organization, coffee, meet-and-greet (K3)

9:30 Lecture 1 (K3): Occurrence, distribution and fate (Amy Lusher)

10:00 Activity 1- Introduction to the tools available, consideration of sample types, and planning collection in groups (planning a sampling strategy incl. metadata) (Marte and Amy).

11:30 *lunch*

12:15 (30 min + 15 min for questions) Interlude (K3): Environmental contaminants focusing on PFAS contaminants at airports - From the viewpoint of Avinor environmental responsible, Terje Aarsand & Peter Holmkvist.

13:00: Introduction to excursion

13:15: Excursion - (Amy, Marte)

- Sample types
- Sample collection
- Handheld IR-instrument

14: 45 Laboratory demonstration

- Density separation – (Marte and Amy)
- Data reporting

16:00 Lecture 2 (K3): Methods for identification of plastic polymers - theory and practice. Extraction methods, contamination avoidance. (Tanja)

16:30 *Pizza (K3)*

Day 2 Thursday

09:00 Lecture 3 (K3): Effect studies in different organisms - aquatic, terrestrial, mammals and cell cultures, microplastic associated environmental contaminants (Alexander).

09:45 Activity 3 (K3, K4 and laboratory) Critical reading exercise

Read and discuss the two chosen papers in groups.

- Each group presents the main findings to the others:
    - What are the highlights and why are these the highlights?
    - What are the main flaws?
    - How could the flaws have been solved?
- Groups answer critical questions, plenary discussion of the papers and answering of the questions for the review articles.

12:00 Lunch

12:45 Activity 4 (K3): Group discussion – what do we do with the data, why are risk assessment important to ID potential risks, what do we need to know to perform RA, knowledge of toxicity, can we define MPs as an environmental contaminant or hazardous pollutant.

13:45 Lecture 4 (K3): Towards surveillance - Risk analysis and management -Food safety estimations and EU-regulations (Tanja)

14:15 Summary

15:00 Departure