Informatics Student Course Feedback 2020/21

http://www.inf.ed.ac.uk/teaching/surveys/2020-21

This report contains feedback from students about a course taught in the School of Informatics during the 2020/21 academic year, in response to the following questions:

- What advice would you give to a student taking this course in future?
- What did you find most valuable about the course?
- What improvements, if any, would you make to the course?
- Please add any other comments you have about workshops, tutorials or labs on this course
- Please add any other comments you have about the presentation of course materials online and their accessibility
- Reflecting on your experience of hybrid teaching and learning on this course, what has worked well for you?
- Is there anything else you'd like to tell us about your experience of hybrid teaching and learning on this course that would help us improve our approach?

Each course organiser receives this report as well as statistics on multiple-choice responses. All these reports, together with student feedback about individual members of teaching staff, are collected and sent to the Director of Learning and Teaching.

Please note that these are personal responses from individual students: some courses only have a few responses and a small sample can be unrepresentative.

Stereotyping and bias, especially unconscious bias, is a serious concern in any survey gathering personal responses. All students received the rubric below before completing the surveys, and you can read a brief introduction to issues of unconscious bias on the university web pages at http://edin.ac/2iypZBv

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Rubric given to all students taking the end-of-course feedback survey

We value your opinions on the courses you take here at the University, as they allow us to shape future delivery and development. We welcome constructive comments about your courses, whether positive or negative, and ask you to give details about any issues in order to help the course organiser to understand and address them.

We encourage you to be aware of the potential for bias in the completion of these questionnaires, so we have developed resources which may be helpful to you:

- Equality, Diversity and Unconscious Bias (http://edin.ac/2iypZBv)

You also have a responsibility to provide feedback in a manner which does not breach the University's Dignity and Respect Policy:

- University of Edinburgh Dignity and Respect Policy (http://edin.ac/1Cq0VZY)

The results of the questionnaires will never be analysed in a way that seeks to identify individual students from their responses. However, should you wish to remain anonymous, please do not identify yourself in your answers to the survey questionnaire implicitly or explicitly.

Comments Report

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1. Machine Learning and Pattern Recognition [INFR11130_20-21_SV1_SEM1_ONLINE_CACORE19] -

1.7) What did you find most valuable about the course?

- Being forced to code math from scratch

- Course content

- Different aspects in ML

- Everything.

- Everything. The material is challenging, important, detailed and insightful. Tests are also challenging and thought provoking. Lecturers have a lot of knowledge- talking with them and asking questions was very useful. Lecturers are always keen to introduce even more knowledge out of boundaries of the module which always fuels interest and curiosity.

- Everything. This course is gold (seriously, I'm not being ironic). Overall it is a very very demanding course but it is so worthwhile because the explanations are really good and answering the questions literally made me feel like I was genuinely improving my (very limited) understanding! I like how the course goes back to the fundamentals and how it walks us through some important practical aspects as well (even though is somewhat focused on theoretical understanding). For someone like me who has not really done much ML before this ended up working quite well (given enough effort... of course)

- Excellent instruction, interesting material, really helped my understanding a lot.

- Extremely well adapted for home learning - it was clear what needed to be done each week and where to find relevant resources. Love the format of videos embedded in notes.

- Far more feedback than my other courses. Actually felt like there was content to learn. Other courses seem to teach very little and then just give some coursework out that requires you to learn everything on your own in order to accomplish it.

- Great course.

- I enjoyed developing my mathematical thinking around machine learning and breaking down modelling problems

- I found Gaussian Processes to be the most useful component of the course. This is an advanced topic that is hard to get information about outside of university (like on coursera).

- I found the weekly assignments coupled with detailed feedback the most valuable part of the course.
They were very helpful for me to understand some concepts on a deeper level than I would have just from reading.

- I liked the weekly notes questions, and the videos, sure I won't get a good grade on this course, but it's a very well made course :D

- I love this course. This course prepared perfect material! And the lecturers are very kind and helpful! thanks you so much! It helps me form a deep understanding towards machine learning

- I loved developing the deep theoretical background for machine learning. This has been a challenging and intellectually stimulating course.

- Iain's note and marker's feedback are useful clear and easy to understand. Most of the question are challenge but lead you thinking of the data.

- It is just taught the way I expect, more math than codes. I think for the code part, it will be much easier for us to learn by ourselves. I really appreciate Iain and Arno's well-prepared videos every week. The question in the lecture notes and question sheet are always surprising, it forces us to think about these aspects and to have deeper understanding. It is always a challenging and time-consuming work to do the question sheet, but the process is interesting. The form of workshop is good, it provides us with a chance to discuss the given topic or the problem we met in learning MLPR.

- Many things, all of the knowledge are valuable.

- Most materials are thoroughly explained

- The content and organization.

- The content was amazing and really interesting. In general i found the course to be exactly what i was expecting.

- The content was very well written and video recordings were helpful for more details. I found the note questions very helpful for building an understanding of the course content. I am amazed that marks and feedback were given so quickly (within a week of submitting), this was very helpful since the questions were still fresh in memory so the feedback was properly considered.

- The course was overall very stimulating, I enjoyed the style of teaching, grading plans and the lecture notes' structure. Everything was explained succinctly but efficiently, and was made to be very engaging.

- The different outlook on Machine Learning, which is different opposed to a more practical course like IAML.

- The effort that the professors put into it.

- The effort that the two professors put into the course website, testing system and videos. I thought it was really well organized and thought through. I also really enjoyed the discussions I had with my tutor and tutorial group. It made me feel more involved in the school and course despite being far away.

- The embedding of pre-recorded mini lectures within the notes, as well as reading questions, worked really well. It felt sleek and professionally done. The content was laid out in a pedagogical order, and was overall fairly easy to follow if I put the time into it.

- The emphasis on thinking for yourself

- The explanations given during the course is clear and illustrations help with the theoretical understanding.

- The fresh understanding of the knowledge that I might already learn but has not gone deep, like PCA and Gaussian Process.

- The language and approach seemed to be at the level of researchers so I felt I was learning the tools necessary for research.

- The lecturer's clear interpretation and the really well organized course videos and lecture notes.

- The notes were very well written and the videos were well produced

- The questions that immediately followed the lecture videos.
  Also, the amount of work- you changed between week 3 and 4 was huge and appreciated.

- The style of teaching is excellent. The lecturers cover the intuition behind complex concepts which is well explained and often hard to find in textbooks etc.

- The teaching format.

- The tutors in the tutorial groups did a great job at answering/explaining any questions I had.

- The video lectures and online notes were *incredibly* well done and informative. By far the best organized and taught course I've taken.

  The questions were challenging but fair (for the most part).

- The videos were absolutely superb. Well paced and clear, both visually and in terms of content. The best video-based learning content I've experienced. I thought the method of assessment was excellent, much better than a traditional exam.

- The videos were great, super structured and easy to follow. Hypothesis was also very helpful to get instant feedback but also to just see what other student were asking.

- The way Iain and Arno are explaining stuff is just perfect. Top Hat was also very helpful, notes, interesting thought-provoking assignments. I really enjoyed it!

- They used an online platform where they knew very well how our preparation was. So I think they "tuned" the weekly workload according to it. Very good use of hybrid approach.

- This course does not go through some classical machine learning algorithms superficially like other ML courses, e.g., SVM. Instead, based on some simple models (e.g., linear regression, etc.), it illustrates different schools of ML research, like the Bayesian method. This is what I think most important and valuable, which is also what I expected to learn,

- This course has been by far the most interesting of my MSc program thus far. The lecturers are amazing and really engaging. They really enjoy their job!

- Videos

- Weekly even workload throughout the semester, and good instructors. I particularly enjoyed the discussion groups.

- What I found most valuable was to learn some of the foundational machine learning concepts in depth. The course seemed aimed at developing critical thinking around machine learning to be able to explore and develop novel ideas. In my opinion, this aim was achieved thanks to how the course was taught and structured.

- the ability to understand the mathematical aspect of machine learning

- the material is full of details and make me think about the question deeply.

- the well-organised notes and questions that are closely connected to the course.

- well arranged course material, fast response,

1.8) What improvements, if any, would you make to the course?

- Add at least some data work. Especially to the Bayesian part.

- Although I understand that this course focuses on the theory, and is not a coding course, I think a slight more focus on coding machine learning approaches, even if just in assignments, could be really helpful.

- An in person option for tutorials would have been nice. I realise the logistic and organisational nightmare that would be, and hopefully this isn't really an issue for next years version of this course. At times the questions were annoyingly vague - I get the point of that - but it did occasionally feel more like an exercise in English language skills rather than machine learning.

- Bayesian regression and Gaussian processes (week 4 and 5) could have been explained better. Notes could have a better introduction, structure, and introduction to the structure (e.g. table of contents). It also seemed that in the notes (not the videos) the lecturers tried to explain things in the least amount of words possible, which sometimes introduced vagueness or ambiguity, especially for non-native speakers- more detail, examples or code would be better. Online tutorials were sometimes not as productive as they could be due to vague and unstructured tasks.

- I believe it needs no improvements. Everything is crystal clear and well-organized!

- I do not know if in the future the course will conserve the weekly assignments, but I think in general it was very helpful to have weekly feedback on things that I could improve. However, I think that an enhancement could be made in the level of detail of the feedback provided, since for some weeks it seemed slightly vague and difficult to act upon. This was particularly relevant for questions where my answers did not coincide with the example answers provided, but still were not wrong in the sense that the question admitted various correct answers. In some of this cases it was hard to understand how my answer could have been better even though it was not wrong.

- I think the lectures are well prepared but I think that at the same time they expect us that we can answer to the question sheets but ... we cannot answer because for us it is diffuclt to notice something since we approached a lot of different topics! and we did not study so much because the workload was high (together with other courses)

- I think we can have more math on this course. Understanding a method mathematically could also be funny!

- I would appreciate if the course organiser can provide a demo code for each week's notes: although I have learned much mathematical knowledge about ML, I do not know how to apply it and write ML code to solve practical problems.

- I would like there to be more motivation and explanation of all the Bayesian parts of the course. It's very different to 'standard' machine learning course content, so I would like more examples of how it can be used and why we're learning what we're learning.

- I would preffer a little bit larger exercises. The extension would be some easy exercises on each week assignment.

- I would reduce the Bayesian regression part in favor of other advanced techniques like Variational Autoencoders that are mentioned very often in Artificial Intelligence literature. My reason to take this course was to get a better theoretical understanding of neural networks in its various incarnations (essentially the Theory to MLP). So an introduction to Bayesian Neural Networks would also have been interesting. Alternatively, it would also make sense to offer a course MLPR 2 in the second semester that deals with these advanced topics.

- I would suggest balancing the workload more properly, I believe the first three weeks definitely scare somebody to quit.

- If possible I hope the answer to the homework could be given out earlier, they don't necessarily need to be given out with our homework scores. Because after a whole week I almost have forgotten about what I was entangling with.

- It was a lot of work. I don't think it was a good idea to put the exam and an assignment on the same week.

- It will definitely be better if we can have more coding practice related to the course materials because sometime I find things too theoretical. I don't really know how to apply what I have learned into real practice, especially with the Bayes related subjects. And also it's still too much workload because before they reduce the workload I spend about three whole days everyday on this course, and after that I spend no less than two days (more than 20 hours). It's still too much compared to what is expected to be 12 hours or so.

- It would be better if the details in Bayesian Learning and later materials in approximation and variational inference could be explained better.

- Maybe it would be better to balance the difficulty of each week's question sheet, sometimes it's too hard and really time-consuming.

- Maybe more time to finish the weekly question sheet.

- Maybe sometimes the expectations could be lower from the lecturers. The course overall is very demanding with weekly assessments. Some weeks were a bit more challenging and especially at the end, where all the deadlines are. Overall a balanced course though.

- Maybe the tutoirals could be more focused on a rigid task to do before ? This is the most well made course I've taken at uni though, 10/10

- Minor thing - often I found myself struggling more with interpreting the questions than actually answering them. Maybe draw inspiration from what confused people this semester to ask the questions differently next semester (although generally the questions were very well formulated).

- More structure in the tutorials e.g. question sheets to complete.

- Not sure

- One actionable one: It is difficult to digest the material because assessments and discussions immediately follow the first contact with each piece of material. It would be good if tutorials were skipped on weeks with very high workload, or operated as a drop in session if you have questions. The discussion aspect of these groups added stress and was less useful than help on content would have been.

  One less actionable cry for help: Please consider the amount of time required to complete some weeks (has put a lot of pressure on my other courses and delayed work on my dissertation!). I enjoyed putting effort into the course, but MLPR has completely dominated my work week every week (often squishing everything else into the weekend).

- One thing I noticed, and it could be just my personal weaknesses, is that the content got a bit harder towards the end of the course right when every other class had assignments due. Perhaps if the hardest content could have come a bit earlier with the last week being a bit lighter that would have been nice! You can't get everything though and perhaps some people thought that the latter content was easier or there just simply wasn't enough time to get to those topics before.

- Only (minor) improvement would be a reduction in the workload of the first assignment.

- Only minor ones, like adjusting the weekly workload if the course is to be held in a similar format again.

- Personaly i would like to have seen more coding in the course, although there was some it is a bit harder to make some connections between the theory we learned and the implementation of it. Additionally, i found the weekly assignments extremely challenging compared to the class test, or the material in general. On one hand, it did help me understand the material on a deeper level due to the difficulty, but on the other hand i caused too much stress and i had to account at least 2 days per week just for the MLPR assessment.

- Probably better feedbacks on some questions

- Some areas felt like it was purposely left out in order to be an assessment question (e.g. K Nearest Neighbour). While I understand that assessment questions require further thought, I would appreciate if concepts that are worthy of its own chapter not be deliberately left out as an assessment question.
  I would also appreciate if there could be greater transparency on the level of answers required, given the word limit. As the questions are phrased rather broadly for open-ended questions, it is more open to interpretation/misinterpretation while the answers seem to be marked more harshly.

- Some of the weekly assignments took multiple days to finish as I felt I had to research the answer.

- Some questions in the weekly assessment are a little bit too "open-ended ". Sometimes I just had literally no idea what are they asking for. However, when the answers are given to us, I realised that is something that I know but I can not relate to when doing the questions. Perhaps a little bit more directions on this kind of questions.

- Sometimes I found the volume of content quite high which didn't leave me much time to practice through writing my own code or working on things I didn't understand, but I do appreciate there is a lot of content to get through.

- Sometimes a graded question was evaluating your ability to be succinct more than your understanding of the problem.

- The feedback on the weekly question sheets is sometimes slightly lacking. While I understand the difficulty with marking so many people every single week, in certain cases it is important to recognise that the example answers are not enough and the marker needs to step in a bit more.

- The notes for this class were very rarely helpful for the assigned questions. Any week where I did well on the weekly assignment, I did so because I found information on the topic from a YouTube video or from another non-associated website.

- The sections on Gaussian Processes could perhaps have done with more practical examples, as this one of the few concepts I had never heard of before.

- The time limit on the videos per week.

- The weekly questions are very time consuming, especially as we have very limited interaction with other peers (due to the pandemic, not something the school or the course coordinators can really do about).

- This course is desperately in need of a change in attitude towards grading. It's possible to get all the questions for the week correct (with minimal feedback) and still get a ~45% overall. This is not only my experience, but those of my coursemates as well. This is completely ridiculous, and makes it incredibly difficult to progress further in the field.

- more examples and model exercises with solutions, as we were marked on trying to find a solution ourselves (which was really intellectually challenging but mainly involved reading advanced papers to further understand concepts for a huge length of time).

- use the forum more

2. Machine Learning and Pattern Recognition -

2.1) What advice would you give to a student taking this course in future?

- Always keep up. Go through the notes early in the week. Take advantage of the tutorial groups and create a nice environment of discussion there with your colleagues and tutor, as it can be extremely rewarding even if sometimes the discussion go slightly beyond what you will need to know for the course.

- Assume the question sheet will take multiple days. Remember that skipping over notes one week will come back to bite you in the question sheet next week. Talk about the content with people. Consider a different course if the phrase "I spent 30 hours on MLPR last week" fills you with fear.

- Be aware that the course can be very time consuming so I wouldn't take it with several challenging courses together.

- Cannot tell in general - depends on the student's background.

- Challenging but rewarding. Do it if you are okay at math.

- Choose it! RIGHT NOW!

- Expect to work really hard but also a lot of knowledge. Module is more on mathematics, so it might be difficult for people with better background with coding rather than maths. I think this module is a must to take if you want to work with data science or machine learning.

- Focus on your understanding rather than your grades, so you won't get demotivated.

- I think the lectures are very available to give us the math necessary to answer the questions or understand the different topics.
  I do not know it the explanations are clear, because I knew the math, anyway do not be afraid to ask them more explanation.
  Consider that the course is hard mostly because they gave us hard assignments.
  What do I mean? That maybe the questions are not long, but to understand how to answer it took me a lot of time.
  Consider that since it is an overwiev of different topics, it can be challenging. Because if you focus deeply on one topic, or you do an overwiev of a lot of topics, the latter is more challenging for me.

- I would advise them to honestly consider whether this course is right for them and to opt for one of the other Machine Learning courses if they are primarily interested in hands-on experience. To those who decide to take the class (if the class is similar next year), I would suggest that they try to prepare for group discussions to take advantage of the interaction with the tutor.

- I would definitely recommend taking it to anyone that wants to seriously understand ML.

- I would recommend only taking this class if you had taken IAML, as this course doesn't not do a particularly good job of teaching any of the topics required to succeed in the class

- I would recommend this course if you already have some knowledge about Machine Learning. This course will then help you to go further on the ML theory and better undestand the concepts. It can be a challenging course if it is the first ML course you take.

- I would say to just focus on what you can control and less about getting good grades. There were a couple of weeks where I didn't do so well and some weeks I did a lot better. If you just focus on the material and do any background learning that you personally may require (perhaps you have a certain weakness in one of the pre-req areas) then the good weeks should balance the bad and you will get a good grade in the end. I would also say to expect a challenge and to learn to view poor grades as a learning experience rather than an insult. I would also implore students to take advantage of the wealth of knowledge that the professors of this course have in the area. So ask questions! This may be easier for future students as the university experience returns to greater normalcy.

- If you are from a physics background (as I am), and you're wanting to learn machine learning, do this course. They make a big deal about the maths background being hard, but it's really not in comparison to any other physics courses you're doing (they avoid actually doing the Gaussian integrals). That being said, because they assume we're comfortable with the maths, the course does cover a lot of ground in quite a lot of depth, and feels like a satisfying summary of machine learning - both how it actually works, and some of the usage and even ethics concerns. The course starts slow but really picks up after a few weeks.

- If you are highly confident with your mathematic skills, then this course is one of the best course in UOE.

- If you cannot do the self-test, you don't have to be panic. I could not do almost all of the questions but so far I am comfortable with the math.

- If you find you have more time in the earlier weeks, spend this time working on your maths or programming skills (whichever need the most improvement) as you will need them more as the course develops. If there is a topic you find difficult, look at the topic in the recommended textbooks and discuss in your tutorial as sometimes it can help to see it if from a couple of different perspectives.

- If your schedule allows, I think going through the week's notes as soon as possible is especially beneficial for this course, as it allows for more chances to discuss the content with colleagues, both in hypothesis and the workshops, which helps a lot when it comes to submitting the assignment by the end of the week.

- It is a very valuable course. I am lucky to take this course and have lecturers like Iain and Arno.

- It's a fantastic course!

- It's a tough but fair course, only take it if you're interested in the mathematical subject matter.

- It's challenging but it's worth it.

- It's good, but is very time consuming, definitely pushes its weight of being a 20 credit course.

- Just take it. You will be inspired.

- Just take this course if you are really interested in Machine Learning. I will use this analogy to describe MLPR: Other machine learning courses may just be sightseeing on the sea surface, and you think it's beautiful to see the beaches and islands. But MLPR takes you to dive into the sea and see how the island is formed. I think MLPR is the best machine learning courses I have ever studied. It does not list algorithms as superficially as other courses and then asks you to practice. On the contrary, MLPR teaches the ideas and philosophies behind different machine learning schools. Take linear regression as an example, from the basic least-squares method to the Bayesian method assigning a distribution to parameters, and further making the function become a distribution (Gaussian process). All are step by step, which gives you the opportunity to think and compare. Why do we do this? Why do we use this method?

- Keep up with the course content, but be careful not to spend all your time on it.

- Keep up with the course work, don't wait till the end of the week before you start working on the questions.

- Make sure you're comfortable with mathematics. I had a mathematics background and at times it was hard for me. You don't need too much programming background on the other hand. If you want to learn machine learning not just how to import sci-kit then go for it.

- Make sure your linear algebra is up to scratch. Make sure you can do basic programming in Python with Numpy. (These prerequisites are very clearly communicated anyway).

- None. I can barely survive myself.

- Not sure

- Only take this course if you are interested in reasearch, do not expect any practical implementation (although there is some), the course focuses on the math and science behind machine learning. You should have a good knowledge of linear algebra and probabilities.

- Please do check your math background and your enthusiasm to machine learning!! You need to check your aim first. This course talks little about code, if you choose this course for a practical reason, then it's not suitable for you. If you have a good math background and are really interested in machine learning, please do take this course.

- Read and learn some of the class notes from last year before you take the course, if you have time. My degree wouldn't have fully prepared me for this course as I didn't really do any mathematics. Understand the basic probability and statistics stuff that comes up in the first few weeks. Make sure you are familiar enough with python and numpy that you can plot some graphs and dot some arrays together and things like that.

- Read more online

- Really consider it before taking it as the first three weeks are not representative of the difficulty that is about to follow.

- Since concepts build on each other, future students need to ensure that they understand all past content before they are able to fully grasp later topics.

- Start the questions early so you have time to ask for help

- Students should have many abilities on great level. One is reading skills! Other than than students should have a solid background of linear algebra and probabilities.

- Take it if you want to learn more about mathematical theories behind machine learning and be prepared to spend loads of time (more than other 20 credits courses) in it.

- The hardest part (in my opinion, I'm sure this'll differ for everyone) is the probabalistic models. If you are thinking of taking this course, make sure that you are comfortable with probability - not just in the sense that you can answer probability questions, but also in the sense that you have built up a bit of *intuition* about probabilities and how they work.

- The learning curve is very steep. When people say this course is quite difficult they are not exaggerating. Take advantage of everything that is offered and definitely do all the recommended readings, particularly Bishop, even if you already think you know about the topic

- The more fluent you are in relevant mathematics the more your will get out of the course.

- This course is definitely great and totally worth all your effort on it. Iain and Arno are great at the lecture. It is hard and the math needs time to do, but just be aware before take it and prepared, you will be fine.

  This course is not really a beginning course, also the material is fundamental ML, but the thinking part do requires some previous understanding if you want to get an A.

- This course will take up the majority of your time, and you'll have nothing to show for it but mediocre grades. It doesn't really matter how well you do, your grades will be limited arbitrarily and without recourse. It's a real shame too, this course is wonderfully taught and the subject matter is genuinely fascinating—but the impact it will have on your grade average is not worth it.

- To carefully evaluate what aspect of machine learning she is pursuing whether an applied one or one with more in-depth understanding. If indeed the latter is the one desired, I think this is the ideal course for it. Based on this I would encourage her to make it a priority on the semester, since I believe that is a course that as more time you invest in it you can get much more from it. Of course this is the case for most of the courses, but in my experience this trade-off of time invested and learning was the highest in this course. So, I think it is especially worthy to do more than the minimum necessary in it.

- Try to answer as many note questions as you go through the material.

  Be comfortable with Python and numpy.

- You need to be familiar with probability and basis linear algebra. You do not need to have a high level of programming skills. Basic python experience is enough for this course.

- use the forum more, start every week material as early as possible, communicate with classmates more

- very valuable courses and try to think the question by yourself before asking the question to others

3. Machine Learning and Pattern Recognition -

3.2) Please add any other comments you have about workshops, tutorials or labs on this course

■ Although we had some discussion they didn't really help my learning.

■ Appreciate if lecturers could also share a short summary of the various weekly discussion topic.

■ Conversation was helpful but I would prefer them to be more structured.

■ Glad there are workshops. Discussion element is unhelpful. Posting questions about the content the night before was a more helpful format. Having these assessed was a good motivator (but it would be good if weeks with higher workload didn't include tutorials in the assessment).

■ I did not find the weekly group meetings that necessary.

■ I didn't find the discussion groups very useful as it was hard to discuss with complete strangers.

■ I do not know if it was due to the digital format, but I found that the discussion in the tutorials was not as fluid as I would have liked. However, when good discussions were achieved, I found that I was able to learn a lot from my fellow students' perspectives. So overall, I think the discussion format is very well-suited, I would only think in ways to further facilitate the discussions, but in general I think the tutorials were useful and interesting.

■ I don't know if the group tutorial things really worked out this year. Maybe because it is all online and I have never met these people and most of them do not really try to communicate during the tutorials but I do not feel particularly comfortable with my group. I don't understand the things we talk about and mostly just want to try and learn it on my own because it is incredibly hard to ask reasonable questions and get your point across in this format. If something doesn't make sense to you it's hard to ask good questions and hard to interpret the fragments of answers coming at you. I generally need a long time to process some information before I even understand what I don't understand about it. Also, most of the focus is on the 2 or 3 dedicated members of the group completing the write up for the discussion task because they want their 10 percent. I don't know what I'd prefer. Something that focuses on the very basics of the topic so that the tutor can see if there is anything he could talk about to shore up peoples foundations. If the point being talked about is something difficult then 5/6 people just sit there in silence while the one smart guy says things we don't understand. I'm the only one in my group to have contributed anything at all before the meeting, and got no response, so I do not feel that it is a good source for information.

■ I enjoyed them very much.

■ I found the tutorials implementation really good, although i have to say some of my teammates did not speak during the tutorial and we were just 2 or 3 people conversing.

■ It was fun to meet other students and discuss about the lecture. The tasks involved some problem solving as well

■ More interactive tutorials (i.e. collaborative notebook)

■ My tutor was really great. He managed to make our group feel attended to while simultaneously managing others. I am not sure how easy he found that though! The groups provided a sense of camaraderie in the course and I personally learnt a lot through the discussions that we had in the group sessions.

■ Our tutor was very helpful, and the flexibility in the questions and answers for the tutorial tasks helped make the tutorials more elucidating, rather than having to rush through answers for each of the suggested questions. I am not sure how attendance was taken, but in my tutorial group only three other students were active in the calls. The rest either did not come, or came but stayed in mute during the whole session. This has definitely been worse for me for other classes that have not taken attendance at all, however.

■ The tutor was great and always helped us have great discussions and make us think hard about problems (Thank you! =D). We managed to build a great environment of interested people and I learned from talking to MSc students. Asking questions in advance also proved very helpful with long form written answers from the tutor being provided in a few days.

■ The tutor was nice and knowledgeable.

■ The tutorial discussions were by far the most valuable part of this course as far as learning the material

■ The tutorials were surprisingly enjoyable, but they would have been so much better in person. Poor internet connections and occasional technical problems did get in the way. The tutor was very good. He was approachable and clearly explained things, but also was helpful in answering questions about doing a PhD here, and the procedure of applying.

■ The tutorials were very enjoyable and interesting. Found it helpful to learn from other students. The instructor for my group was very helpful and took the time to explain concepts that anyone in the group was struggling with. All in all, very good experience.

■ The weekly discussion groups were helpful for interacting with fellow students and discussing relevant topics.
The fact that it was loosely assessed encouraged participation.

■ The workshop is good. When our group has no idea about the topic, the tutor will give us some guidance and some inspirations.

■ Tutorial discussions were very useful not just for understanding course material, but also for discussing more advanced topics with the tutors.

■ Tutorials were good but the tasks were a bit vague. It was very useful that they were based on discussion and case scenarios, rather than calculations or maths, every group member always contributed with some personal knowledge.

- Tutorials weren't that helpful in the context of the weekly assignments. Questions were far easier and broader in the tutorials and it would've been more helpful if we had similar questions to the assignment that we could work through with our tutor.

- We had a very good tutor and there were some interesting discussions going on. It was also good to meet other students and be able to ask questions besides the course topics as well.

- We only had tutorials right? I didn't find them very stimulating -- I had the impression we just said things so that we'd have something to write up. When the tutor was there, they were more productive.

- definately tutorials were beneficial because, for me it was a great opportunity to communicate my ideas about machine learning problems .People should learn how to communicate ideas!

- for the weekly meeting, not very useful

- the tutorial is really helpful

- the way the questions were placed and asked in a mixture of math, sentences, and code was very creative and refreshing.

- very good to understand how we felt during the week. and also funny

4. Machine Learning and Pattern Recognition -

4.1) Please add any other comments you have about the presentation of course materials online and their accessibility.

- Best presentation of course materials ever. Good job!

- Brilliantly presented given the circumstances!

- Course material were presented in a very clear way that allowed me to fully grasp the course material.

- GOOD

- Generally good.

- Generally it is great. Notes structure and introduction could be improved. The simple website design provides no disctractions when studying. It is a bit sad that we can only increase the speed of the videos by 1.5x (too quick to hear words), not 1.25x.

- Great presentation of course materials and easily accessible.

- I really enjoyed the teaching approach used in the course. Specifically, I liked that the instructors developed the ideas (with pen and paper) as they explained them rather than reading off a list of bullet points in slides. Before taking the course, I was slightly worried about the math depth which it would require, since I was worried that it would turn out to be more of a math course than a machine learning one. However, I was very pleased with how this was approached. Specifically, I was glad that math rigour was used whenever required to have a good understanding of the subject, but that the focus was always on the machine learning concepts rather than on the math underlying them.

- I think that the Hypothesis Forum was very helpful.

- I think the presentations were ultra condensed. I had difficulties in gaussian processes, maybe one think that would help me , it would be some additional examples on videos, and some exercises with solutions to take more stimuli.

- I thought the online course worked really well and that the organisers did a great job to get something so slick up at such short notice

- I was very impressed by the course homepage - it is very functional and never let me down. Also, I liked the weekly assessment - this forces you to keep on top of the current topics. Also, it spreads out the workload nicely throughout the semester.

- Iain's video on juggling balls was impressive.

- It was excellent.

- It was really well organized and easy to use.

- Perfect!

- See above - superb.

- The combined notes, questions and videos were excellent.

- The course notes are great!

- The course website is great, and the QSys integration is flawless.

- The course website is nearly perfect. As simple as it gets but gets the job done extremely well. It is well organized, never lags like Learn (yeah...), things are easy to find and navigate. The jump to the external videos kind of breaks the flow but there may not be much to do about it. I think embedding them in the notes would create too much 'pollution'. I like the interaction model via Teams as well. This was the course that managed to keep me the most engaged in every way.

- The lecturers clearly went to a lot of effort to make sure this course was adapted to online learning. The videos, notes and use of online tools was very good.

- The materials were excellent and I found Iain's lecturing style particularly effective.

- The mix between written and videa lectures was really helpful and stimulating.

- The notes are too succinct to be helpful, the course says you should also be reading the textbook and watching the videos, but even after doing so there were several times I needed tk seek outside resources, or look back at IAML notes, to understand.

- The notes are very well-organised and can be easily accessed using the course website.

- They are all good and well-organized.

- They are really good and well made.

- This course has been my favourite course at university so far. It is clear a lot of effort goes into it, and it definitely pays off!

- This course should serve as an example to all Informatics courses for how to present course material. Very accessible.

- Very well-organised course.

- Very well-organized

- overall- very good

- sometimes the lectures' content is very similar to the note, but sometimes not. it makes confusion.

7. Machine Learning and Pattern Recognition -

7.1) Reflecting on your experience of hybrid teaching and learning on this course, what has worked well for you?

- -

- Everything was okay.

- Everything.

- I am not sure how this course operated before the pandemic, but I personally don't think my experience with the course could have improved that much if it hadn't been done virtually, so I think everything worked well for me.

- I liked being able to explore the content as I liked and not feeling like I was behind if I started a day later than others

- I liked that the videos weren't full lectures but a video per topic instead. The professors were very approachable and available in spite of the digital teaching.

- I liked the hybrid learning model for this course consisting of weekly tests instead of one final exam

- I most appreciated the ability to download lectures and play them locally.
I liked Hypothesis for sharing and managing feedback on the notes.

- I never had any issues with hybrid learning on this course. Microsoft Teams worked well for tutorials, and the course website had all the information I needed.

- I only did stuff online

- I prefer online lecture videos (when they are of this standard) than in-person lectures. I much preferred the method of assessment than a traditional exam.

- I think I am more OK with written course notes than live lectures, thus I find this learning mode is perfect for me.

- I think it worked out fine for me. With the pre-recording video, I can just stop the video where I want and I can listen to it again and again if I am confused about anything. The 'hypothesis' learning forum is very useful as well as it is a great opportunity for students to communicate ideas about the notes.

- I think the professors did as well as could be expected. The pre-recorded videos embedded in the content allowed me to pace myself and work when was convenient to me (once I got the questions submitted in time!) This was extremely helpful due to the time zone issues and other live lectures. Sometimes the week's work felt a bit overwhelming but again that may be more due to my own personal strengths and weaknesses than the content itself. Overall I felt like professors made an effort to stay connected with the course and the continuous assessment meant that, despite not having the impetus of a live lecture, I was forced to stay on top of the work throughout the semester.

- In general yes. I do not think that the hybrid teaching approach hinder in any way my learning in this course. The only difficulty I faced with respect to this was developing meaningful conversations with my classmates.

- Many opportunities to interact with instructors

- Perfect!

- Somewhat, but as this learning style is new for everyone, I doubt there is an "optimal" style.

- Starting on the course earlier in the week, in order for the new topics to have time to sink in.

- The availability of downloading of videos are helpful, which means I can download and watch the videos without internet. In some other courses I found videos could not be downloaded and I could only watch online.

- The course was fully online, which I have really enjoyed because it gave me a lot more flexibility.

- The fact that videos were made that weren't just the lecture slides with a voice over was invaluable. Having the lecturer walk through the steps of a question while writing out the work was better than most in person lectures I've attended at my three years at university so far.

- The good side is I can review the video for many times.

- The online teaching worked well for this course, there was no in person teaching.

- The questions within the notes were very useful for me to check my understanding as I go through the course.
In addition, having access to the video lectures was helpful because I was able to revisit concepts that I hadn't fully understood.
I think the group discussion was really important to not feel completely isolated from other students.

- The recordings were excellent and the lecturers were always available and happy to answer our questions. The hypothesis tool was very useful, especially for revision.

- There was no in person experiences.

  I have 30 minutes online with a PHD guy once a week, split 6 ways, while we are all trying to do an assessed task. I don't think it

contributes to my learning.

The online material is better than any other course I have taken.

- There were no live tutorials- sad. But I was even happier to not have live lectures since lecturers provided with a great material which I can approach with my own pace.

- This course has worked extremely well even though it is only digital and online. All courses in the school of informatics should try to learn a thing or 2 from it

- This course was completely online, no Hybrid teaching.

- This course was entirely online - it is false to call this hybrid teaching. This course actually worked quite well being online, but if all my other courses were like that I would have strongly considered dropping out.

- This course was well-adapted to online teaching. There was not in-person teaching.

- This was a 100 % online course
  Since it was so well organised, most things went well

- To be honest, I still to be there in the class rather than learning online all the time.

- Working longer hours to compensate for all the admin. Abandoning hobbies. Caffeine. I have also started to take advantage of sleepless nights - instead of wasting time tossing and turning, I simply roll out of bed to my desk and get to work.

- Yes

- clearly the lectures are expert in the use of informatics. with the online platform they understood our preparation and they tuned the weekly workload.
  But stil I think we cannot have prerecorded lectures. They explained very well in the prerecorded lectures, and I think they would have explained better with a blackboard.

- communicate with friends

7.2) Is there anything else you'd like to tell us about your experience of hybrid teaching and learning on this course that would help us improve our approach?

- Exposure to the course instructors would be good to see, i would love to meet Dr. Iain and Dr. Arno and talk about machine learning. Sadly this year they only know us as numbers from our student record.

- Have options for in person contact hours on every course. The school of physics and astronomy managed this.

- I am a fan of hybrid learning - having worked for several years I have always thought it is crazy that we need to go into offices when we could do everything from at home as well! Of course, it is nice to meet colleagues from time to time - so hybrid is great!

- I got little chance to talk about the course material when I was watching the course material. Hence, it's possible to have lots of problems if time is long.

- I have expressed my only gripe in the tutorial section.

- I have very little faith that anyone is going to read this. MLPR specifically does not seem to have accounted for the amount of extra time it takes to complete tasks at home. Other than that my malaise around "hybrid" learning is directed at the university more generally.

- I thought it was excellent.

- I would've loved live lecture. the recording does not solve doubts that are easily addressed through conversation.

- If it were actually hybrid it would be great. I have not had a single in-person teaching experience this semester.

- It would be better to have some offline sessions. As far as I know, there are some courses in other schools with similar content, they conduct the offline session once a week. They also have many students registered it.

- It would be interesting if there was some questions shown to us asked or answered in other discussion groups. Sometimes our group could not think of anything in advance, but it would have been good to maybe see what other groups discussed if that would be possible in case anything came up that would have helped us

- Maybe more explanation on the lectures. Sometimes i believe many logical steps were omitted and i could not follow the idea, so perhaps by adding more details about these topics with more examples it would be definately helpful for me.

- No (2 Counts)

- No.

- The change from an exam to weekly assessments required some adjustment to keep the workload manageable but the feedback was responded to quickly by the lecturers.

- The online tutorials were not particularly effective and I think more structure would have helped get discussions going.

- This course did it very well.

- live lessons. And the site with the notes, so they can understand where we have problems. So both.

- na

- the response of hypothesis is not easy to use. Cannot immediately know one's answer/question is responded.

- would be nice to have something in person

10. Thank you -

10.1)

Thank you very much for taking the time to complete this questionnaire. Your response and comments will be fully considered.

Please provide any additional comments you may have about the course, the teaching on the course or the resources that support it in the box below.

- Again, I cannot stress enough the issues with grading.

- Dr Arno Onken has a very clear explanation in each video, which I can follow and understand easily.

  I would appreciate if Dr Iain can speed slowly and use simple words in the video :). Although there are subtitles for each video, sometimes I find it is difficult to understand your lecture. Maybe it is due to my poor English proficiency.

  I think this course could be better if the course organiser can provide a demo code for each week's notes: although I have learned much mathematical knowledge about ML, I do not know how to apply it and write ML code to solve practical problems.

  Thank you, Iain and Arno.

- I am very glad I took this course and very grateful to the lecturers and tutors who did a stellar job in my opinion.

- I must say thanks to the lecturers Iain and Arno. Maybe one of the most pitty thing I experience in this year is I cannot attend the course delivered by them face to face.

- One of my favourite courses!

- One of the best courses in my program so far.

- Perhaps the best organized course I have taken in the entirety of being at Edinburgh - the professors have clearly put a lot of work into this course and it shows.

- Thank you Iain and Arno for teaching this course :)

- Thank you Iain and Arno. I can tell this has been a lot of hard work from you (two) too and I want you to know it is greatly appreciated from our side. Please keep teaching this course!
  And... (if possible) try to share what you are doing with other course organisers and lecturers in the School of Informatics. I'm sure everyone is well intentioned, but they could really learn from you.

- Thank you for the excellent course (and impressive juggling)!

- Thank you very much.

- Thanks again. I really hope you take this form of teaching using videos into the future. Also, I hope you consider this form of assessment in future, it has worked really well.

- The course is taking me too much time, and I am quite confused about the marking standard because if the answer is half right, I will get 0 marks, then there is no difference between working on it and do nothing. It is unfair. This is continually wasting my passion.

- The video lectures and notes were very good and easy to use but I missed the collaborative learning experience I've appreciated in tutorials.

- live lectures + online notes + questions.

- nothing

- the amount of work- you changed between week 3 and 4 was huge and appreciated.