UNIVERSITEIT TWENTE.

FACULTY ELECTRICAL ENGINEERING, MATHEMATICS AND COMPUTER SCIENCE

DATE: 7 JUNE 2022
OURREF: EEMCS22/BOZ/10832/NL

Minutes 175th PC-AM-meeting
Tuesday 10 May 2022, 15:45 – 17:15 hr.
Ravelijn 1247

Present: *H.G.E. Meijer (chairman), A. Stoorvogel (PD), J.B. Timmer (B-coordinator), L. van Dissel, K. Proksch, S.J. Geerts, L.S. Lanting, N.I. Muntendam, N. Luijten (minutes), F. Schuller, R. Hoeksma, N. Apeldoorn (Abacus), N. Berg (Abacus), J. Schut (M-coordinator)*

Absent (with notice): *B. Manthey (replaced by R. Hoeksma)*

1. **Opening**
   The chairman opens the meeting at 15.47.

2. **Minutes 173rd meeting 8 March 2022**
   No comments.

   Action points:
   - 421 – *Stays on the list*
     Geerts comments that during the master evaluation lunch, it was mentioned that students feel like they are doing the same work twice.
   - 436 – *Stays on the list*
   - 440 – *It can be removed from the list*
     Arend Rensink was disappointed but understood the reasoning. He was happy that it had been discussed with Program Committee.
   - 441 – *It can be removed from the list*
     The chairman proposes June 22 during lunch (12.35 – 13.40).
     Proksch cannot be present physically, but the chairman will put up a hybrid meeting so that she can attend if she is able. The chairman will ask Mirande van der Kooij to make an agenda invite for June 22.

3. **Announcements**
   Van Dissel will stop being a member of the PC next year. The students are requested to think about possible successors. The students comment that they already have someone in mind.

   The expected number of students that will start with AM next year is between 50 and 60. This is less than what was announced during the last meeting.

4. **Advice/correspondence**
   - Mail from Verschuren, University Council, about additional study costs
   The chairman responded, so it has been settled.

- Letter from Korsten, PD-S&C, about combined Final Projects (with attachment)
The combined final project was never administered well. The email described a new method so that the administration is correct. This method is also added to the website.
- Meeting schedule PC-AM
This has been discussed.

5. EER 2022-2023

Master

A. Schedule EER
B. Rights of consultation and consent of PC and FC
C. Master EER A. Faculty section 2022-2023
D. Changes M-EER 2022-2023

The M-coordinator explains that there are some changes. These changes are mostly based on new terminology, and there are no serious changes regarding the programme. The list of the changes represents this very well.

The chairman points out that the cum laude rules are set in the document. The rules are the same for the whole faculty. The rules did not change.

In article A3.4: Exemptions may be granted to a maximum of 30 EC. In the paragraph about cum laude, it states that Exemptions may be granted to a maximum of 15 EC. Schuller asks if this difference in the number of EC is intentional. It is in fact intentional. The M-coordinator comments that students should be informed about the cum laude rules.

Hoeksma thinks that articles A111 and A112 are contradictory. He will mention this in the faculty meeting.
The chairman will write a formal letter to the Dean that the PC would agree on part A without further comments.

The program-specific parts will be discussed next meeting. The M-coordinator expects that there will be a few changes that will involve a discussion. The chairman says he would appreciate it if there were to be a proposal for a general Capita Selecta.

Bachelor

E. Bachelor Guideline and Model EER 2022-2023
The PD states to not have found any big changes in the document. Geerts comments that the document is not easy to read for students, while that is the objective of the document. The chairman responds by saying that one of the authors is trained in law. Geerts says that it is indeed correct and watertight, but still hard to read. They think that this problem is not addressable.

F. Bachelor Accountability document EER EN
G. Updates on new curriculum …
The PD starts by saying that for the course Analysis and Calculus I, the objectives and learning goals are still too focused on Analysis. Now, the learning objectives are also not

separated in Analysis and Calculus, making it hard to define which learning objectives are going to be tested in which exam. This is one of the aspects that still needs improvement. He continues by saying that he tried to make the Programming line clearer in this document. Other academic skills such as presenting are not yet clear in this document. The just mentioned topics still need attention according to the PD.

Double degree programme with Physics

The chairman points out that the spelling of the word programme is with *me* in British English. Furthermore, in module 6, Hilbert Space has been adopted. The learning goals of this topic are similar to some learning goals of Linear Structures II in module 2. Therefore, he thinks that Hilbert Space could be replaced by something else. The PD reacts by saying that Hilbert space prepares the student for Quantum Mechanics later in the module. He agrees that the overlap is there. The overlap was realized, but the topic was kept to create a slightly less heavy study load.
Schuller comments that other topics such as unbounded operators are also of real relevance for physicists and could also be covered in Hilbert spaces.
The chairman responds to this by saying that the topics that are covered in Hilbert spaces cannot be changed by AM, since the course is from the Physics programme.
The PD adds that physics students only got 3 EC of Linear Algebra at this point, while mathematics students have had 9 EC of LA.

The chairman points out that the course Hilbert space has 2 EC in Osiris. Apeldoorn thinks it is an error and he discussed it with the Programme Director of physics. The conclusion is that the course probably consists of 2 EC.

The chairman thinks that Linear Structures and Signal and Transforms prepare the students reasonably well for later courses and therefore Hilbert Spaces is not necessary. He personally feels that the double degree programme as proposed is a solid programme except for Hilbert spaces, where he thinks a different choice should be made.

Geerts points out that he sees no programming in this proposal. Apeldoorn responds by saying it is taught, and it is called Fout 1 and Fout 2. This is translated to Error 1 and Error 2. Thus, the programming is in fact there.

The PD says that the overlap of other courses with Hilbert Space was already realized. It was a choice to make the study load slightly less in this module. The chairman thinks that Statistics 2, the project in module 6, or Systems Theory could be considered instead of Hilbert Space. Schuller asks whether it is possible to put a new course there that AM could offer to the double degree students to suit them better. The number of students and finding an available teacher are two problems, so this is not possible.

Double degree programme with Computer Science

The chairman comments that in module 6, the summation of the number of EC is wrong. In module 10, the project that would normally be in module 6 about Machine Learning, seems very well-suited as an additional topic.

The PD responds by saying that the room given in modules 10 and 11 is basically a minor without restrictions. He agrees the project would be an option as an additional topic.

Geerts thinks that the location of the modeling courses is illogical. Modeling 2 and 3 are separated from the theoretical courses. The PD agrees, but the distribution of the number of ECs makes it impossible to change this. Another strange distribution of courses is the courses regarding the bachelor project. In the third year, the bachelor project preparation is in the first quartile, while the bachelor project is in the fourth quartile. Apeldoorn points out that in the current Bachelor curriculum, during reflection 2 there was an opportunity to work ahead for reflection 3. He does not see how that is still possible if there are three modules in between. The chairman comments that that actually involves students that have a delay in their study programme, and their needs will be catered for separately. Recording the necessary material is an option. Apeldoorn thinks that the reflection courses were more integrated last year. The B-coordinator replies that there is always a lot of switching around in the last year. The problem is that the project in module 11 is very intense, so there is no room to do anything else. This is a design flaw of the curriculum that is realized, but no proper solution has been found.

Hoeksma would like to know more about the study load of modeling 2 and 3. It contains Python instructions, and since it involves second-year TCS-students, he does not think that this is necessary.

The chairman rounds off the discussion by saying that there are two suggestions for the double degree programme, one for Hilbert Space, and one for the project of module 6 for AM. With that, he would like to see the new version.

General AM programme

A comment that is lingering in the PC is that they would really like this new Bachelor curriculum to work out, but time is pressing. The PC would like to express their concern.

<u>Module 1</u>

The chairman reads a comment from Hoeksma that states the following. “I see that in modeling 1 a choice has been made that programming is part of the project. There are a couple of arguments against this choice. Even though the test for this programming is said to be individual, programming is something you learn while doing that within the project. In practice, not every student within a project code deals with the code. Secondly, the current programming description is a one-liner. It is not clear enough what students will learn. It is important for later teachers to know what students learned, in order to build on that preknowledge. I believe that splitting programming from the project allows teachers to connect it much more naturally to courses. Furthermore, it has administrative advantages. Since there is a partial test, you do not need to preserve the partial grade.”

The PD responds by saying that the partial grade is registered in Osiris. The grade of the partial test and also for the partial tests of Analysis can be registered in Osiris. For Modeling one, there will be a grade for programming and a grade for the project. Based

on those two grades a final grade will be calculated.

The chairman points out the rule that partial grades are no longer valid the next year. With splitting the programming from the project, this will no longer be a problem. Furthermore, they are two separate identities, and splitting them will give them this identity.
Splitting the courses also adds to the perceived autonomy of teachers. It has been mentioned that students should not have too many small items. The programming part could be scheduled in the early part of the module, so then the students are not working on too many subjects simultaneously.

The PD thinks that if someone fails the programming then they should also fail the modeling project. He does not want students to rely on their project group if they cannot do the programming themselves. He really feels that the subjects are linked, because you need the programming for the modeling project. The PC does not agree. The chairman says that the PC needs more details about the programming subjects in order to see the viability of that plan. The PD points out that in module 3, there is a lot of heavy programming in the project, and there is a programming course that prepares the students for that project. The chairman says he talked to students, and they said “give us the commands and we can do it”. He thinks that an afternoon session where the details are discussed is sufficient.

The chairman says he understands the reasons of the PD but he thinks Modeling 1 can be designed in such a way that the programming is not needed in the extent that the PD sketches. The PD says he wants as much as a link between programming and modeling. He wants to make sure that programming is graded individually, as an individual test. Also, he would like to see that the students immediately start using the concepts of programming in modeling. So he wants as much of a link as possible. If the courses are separate, he says he cannot be sure that students know the necessary programming knowledge.

Geerts adds to the discussion that, as a student, he would like to have the programming in the project. He does not think it should become abstract programming. However, he does not know what it will solve to combine the courses. He thinks that in project groups, the students will still divide tasks in such a way that every student will work on what they are skillful on.

The PD thinks a disadvantage to splitting courses is that students can decide to skip a course and do it the year after if the study load is too heavy for that student. He wants students to be able to be proficient in every part of the project, not only the part they worked on.

Hoeksma asks whether the PD is now arguing for integral modules, since the same holds for all other courses. The PD thinks that integral modules are perfect if there is indeed a link between courses.
The chairman thinks that scheduling programming at the beginning of the module, with the examination being pass/fail is a good idea. He thinks you would fail the project

anyway if you fail programming. In that sense, programming is regarded as pre-knowledge.
The PD reacts by saying that in that case, a resit must be scheduled. This is tricky in terms of planning. There needs to be time in between the first and second attempts so that the student can prepare well, but the student should also have enough time for the modeling project.

Geerts says that he is fine with combining the two topics, but right now it feels like the programming is being pushed away. He wants there to be more emphasis on programming.

Lanting would make programming and modeling two separate identities that are together one integral subpart of the module. The PD reacts by saying that that was exactly what he was proposing. There is one grade for both, but the subgrades are registered separately. He wants to make sure that there are a lot of opportunities for the students to apply the skills that they learned in programming in the project.

The chairman summarizes the discussion by saying the following:
Programming, as we read it in the current proposal, is not clearly indicated as a separate identity. He asks the PD to make this a much more coherent entity, with learning goals and very explicit descriptions of what the topics and concepts will entail. Then he might be able to go along with the idea of the PD.
The PD says that he made it clear that in the first three modules of the first year, there is a clear programming component. The topics that should be covered and how they should be written down in the proposal document is tricky.

The chairman completes the discussion by saying that both the PC and the PD explained their reasoning. The PC would like to see more details so that this course becomes clearer.

The chairman would like to suggest for the word *basically* to be removed in “every project is basically a group assignment”. For the course Linear Structures, there is a change in the EC distribution, but no change in the distribution of topics. The PD says that he needs to talk to the teachers about this distribution. He thinks that the topics that are covered in LS I in the current bachelor curriculum would fit in 5 EC, and the topics of LS II are reasonable for 4 EC. The chairman says that it seems not justified as it would say that the current situation is incorrect.

The chairman continues with the topic of the TBL sessions. The learning goals related to the TBL sessions can be polished. The assessment and the knowledge can for instance be split. He uses the following sentence as an example: “Students are able to write in five different forms”.

Module 2

Van Dissel thinks that perhaps it should be clear from the title of the course Analysis that it contains Analysis *and* Calculus. The PD says that there was a discussion about the title, and he initially called it Analysis and Calculus. There are arguments to be made for and against. The chairman says that he had the course Analysis I during his studies, and it covered the planned content of Analysis (and Calculus) I, and it was clear that it covered both topics.

Geerts comments that he does not understand how resits are structured if an exam consists of multiple parts or sub-exams. Analysis I and LS I, and Analysis II and LS II all have two components, and students need to pass both. The concept of parts is used in module 3 with the course Signals and Transforms. The resits of LS will be two tests, one being an online test and one being a proof-oriented test. The chairman thinks that a distinction must be made between tests with marks and then the final grade for the course because that is an exam. The PD reacts by saying that he should use the terminology mentioned in the EER. The chairman summarizes the discussion by saying that the semantics of tests, exams, grades, and marks can be polished.

The chairman says that regarding Systems Theory, there is no such thing as an unstable ODE. He has a problem with the courses Systems Theory, ODE, and Introduction to PDE, since he thinks that the line of differential equations is not coherent. Regarding System Theory, before it covered discrete-time, now it covers continuous time, but the learning goals seem to be of the current ST course. He thinks some rearranging of material needs to be done.
The PD says that in Calculus there used to be a basic introduction to ODEs. That is omitted in the proposal. Signals and Transforms in the third module, in the proposal, has a chapter on solving ODEs with Fourier. However, students have not encountered ODES yet by that time. The idea is to correct the omission from Analysis and Calculus I and cover some basic first and second-order ODE in Signals and Transforms. The chairman thinks that the methods for solving ODE (for instance integrating factor) should be mentioned so that it does not have to be treated again in the ODE course.

Since LS is done together with Analysis (and Calculus) I, Matrix exponentials are a natural topic to cover. There is a project connected to this topic. The chairman feels like this project is incomplete. The PD says that the topic Matrix exponentials was mentioned by Gjerrit Meinsma. The chairman comments that the ODE course in module 4 should radically change, which is fine, but he needs to know what students learned about ODE in other courses to redesign the course.

The chairman continues with the course Introduction for PD. There was a proposal discussed in the previous meeting, and one of the comments was that it still felt like a heavy course. Now, the same topics are mentioned, but instead of 5 EC now 4 EC is given to the course. Thus, less EC is given to a course that students consider a lot of work.

The PD says that students that want to follow the PD courses in the master, follow Introduction to PD to have the right prerequisites. Currently, the students that take introduction to PD as an elective, are often the students that go to SACS for the master. If you on the other hand make Introduction to PD an obligatory course for everyone, giving everyone the right prerequisite should not be the motivation of the course. The course topics should become more reasonable considering the number of ECs.
The chairman says that treating boundary value problems with a hint towards linear PDs might be an idea for the remaining 1 EC.

He concludes the discussion by saying that he sees that everything regarding ODEs is not yet polished, and thoughts and suggestions have been given.

In module 3 and 4, there is modeling course and/or project. The learning goals of these courses are not specific enough, as it only states “able to program in python”. The PD agrees that it currently is not clear. He thinks it is difficult to find the right balance for the learning goals, since three 1 EC courses need to be spelled out.
The chairman continues by mentioning that the project in module 4 deals with simulations. This topic is also partially treated in the Numerical Mathematics course. Therefore, it seems like the topic is treated twice, but it is not very clear from the learning goals. The chairman wonders if it should be treated in the project in module 4.

In the current proposal, Numerical Mathematics is much more theory oriented. Also, the number of homework assignments is reduced from six to two. The chairman thinks two assignments are not enough, since the course consists of elements that should be practiced. A poll with the students of the PC shows that the students prefer four homework assignments. The students think that four is sufficient if there is also a focus on the topics in the project.

The chairman summarizes the discussion by saying that the suggestion is that even though a step toward theory is nice, it would be good if there is a better balance between theory and practice.

Lanting wonders why DE has 5 EC instead of 4EC. The chairman responds that he cannot tell, since the entire line must be redesigned.

The chairman has more small comments regarding module 5, 6, and 8. He thinks these can be treated by just sending the list with comments.

The chairman has a question regarding module 8. IEM might bring the mathematics components of module 8 to module 7 instead. He asks if this is true, if there is any discussion about this, and if yes, how it affects our teaching. The PD reacts by saying that there is a discussion about the collaboration project. This is the final project of module 8, and it is criticized often. It is possible that the project collapses. That would not be a

problem since it enables us to address that aspect. There is no discussion about the theoretical courses of module 8. The chairman asks if there are financial repercussions that have an impact on the quality of the education. The PD says that he is not being pushed by financial issues.

Muntendam thinks that if the IEM students do not follow Stochastic Models anymore, it needs some revision. Now, especially the lectures are too easy for the mathematics students.
The PD says that at the moment, there is no intention to change the Stochastic Models course, since the IEM students will keep having the course as well. The chairman suggests helping the teacher by giving him more information regarding the level of second-year mathematics students.

The chairman has a comment on module 5. In the current Bachelor curriculum, module 3 involves the history of Calculus in relation to physics. This history course is gone in the proposal of the new curriculum. However, Reflection 1 is positioned next to Vector Calculus in module 5. He asks whether it would be possible to at least mention the relation between physics and mathematics in Reflection 1. The PD reacts by saying that Reflection 1 is now more aligned to Statistics, but that can be changed.

The chairman comments on the electives. In the proposal, there is no specific choice given. He thinks that one topic from each master track would be fine. The PD says that he had a discussion with Mathias Schlottbom and Carlos Arancibia Pérez. They were suggestion a modeling course from a SACS perspective, a Scientific Machine Learning course for MDS, and the other topics were not yet mentioned.

Hoeksma has a general comment, namely that it would be nice to see an elaborate list of the topics that the program wants to solve, and how the new suggestions solve the problems.

Van Dissel remarked in the previous meeting that the topics in Graph Theory are similar to what is taught in the project in module 7. However, the topics are in fact very different. The description of Graph Theory needs to be changed to represent this better. The chairman summarizes this by saying that the way that graph theory is presented in the proposal needs work as it seems to overlap with the project when it does not.

The chairman will collect the four emails with comments that he received into one document. He will change the comments on programming due to the discussion.

Muntendam comments that in the course Mathematical Statistics of module 5, the program R is not mentioned in the learning goals. He wonders whether it is necessary to do R, and not stick to Python. The chairman responds by saying that R is within the

statistical community the right choice. R is useful to have learned if you want to do anything with statistics. The PD mentions that in the new curriculum Python and R have been chosen as the main programming languages since the language is rather similar.

Action Point: The chairman will write an email with all the points that the PC feels should be addressed.
Action Point: The chairman will write a reaction regarding the master EER to the Faculty Council.

6. AOB / Questions before closing the meeting

The chairman asks the following: Due to the shortage of lecture rooms, there is a rule that states that 20% of all lectures must be in a different form than physical. Would it be possible offer some support to teachers and could there be coordination on programme level?
The PD says that it has been discussed this morning, and an email will be sent soon.

7. Closure

The chairman closes the meeting at 17.29.

Next meeting: 7 June 2022

Nr	**Description**	**Meeting**	**Responsible**
421	Ask the teacher of Mixed-Integer Optimization (previously Optimization Modeling) to send the learning goals of the course to the PC (as well as adding them to the OSIRIS page), and to check those against the ones from the Master math course Advanced Linear Programming. Correspondence via email is sufficient.	14/09/2021	PD
436	Talk with the lecturer of statistics regarding his way of teaching.	03/04/2022	PD
442	Write an email with all the points that the PC feels should be addressed.	10/05/2022	Chairman
443	Write a reaction regarding the master EER to the Faculty Council.	10/05/2022	Chairman