

UNIVERSITEIT TWENTE.

To: Prof.dr. A.A. Stoorvogel, Programme Director AM
From: Programme Committee AM (OLC-TW)

FACULTY OF ELECTRICAL ENGINEERING, MATHEMATICS AND COMPUTER SCIENCE

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PC-AM@utwente.nl	OUR REFERENCE	CC:
	EWI22/BOZ/10842/MvdK	--

SUBJECT
Advice Bachelor EER Applied Mathematics 2022-2023

Dear Programme Director,

We have read and discussed the proposed Bachelor EER for Applied Mathematics (BEAM) for the academic year 2022-23, including the proposed new curriculum.

Regarding the regulations for BEAM, we note the following critical issues. We acknowledge that most of the previous article 2 (Description of Modules), here 9.2, is dropped. We do not object to this removal; instead, we believe it would be good to describe the learning lines in a suitable place, as that will be helpful in several aspects, such as administration, evaluation and orientation.

Article B9.3 Programme Intended Learning Outcome five mentions Computer Algebra. In the new curriculum, using Python and R only, this skill is no longer taught. Hence, this topic should be removed. Instead, "programming skills to implement algorithms, numerical methods and simulations are key..." could be mentioned here.

Article 10.11 The evaluation and improvement of education only mentions which primary sources are used as information. Given article 3.12.3, the PC-AM believes this description is incomplete. We suggest adding an item describing how this information is used by the programme and programme committee. Such info may help students and staff find ways of channelling suggestions and complaints to the appropriate body.

Article 13.1 The ECs listed for Analysis 1 and Hilbert Space should be corrected. We acknowledge that the programme AP wants to change the course Hilbert Space. We would like to see that course proposal, as the current description suggests complete overlap with the course Linear Structures 2.

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Article 14.1 details the AM-TCS curriculum. We believe the course Optimization Methods and Neural Networks in Module 6 should be part of such a curriculum. Page 37: footnote 3, change 13.1 into 14.1

Regarding the new curriculum, we note that some improvements have been made. There are, however, still many instances where the curriculum is not clear enough to guarantee the quality of tuition.

Some questions raised concerns regarding the implementation of the curriculum. The information provided during the meeting regarding which lecturers are involved, took away some concern. However, the three courses Systems Theory (M2), ODE (M4) and Intro to PDE (M11) form a learning line that is not yet clear. Choices for Module 2 affect later courses, and we remark that these matters have not been discussed with the current and prospective lecturers. We think this is still a major issue to solve.

In Module 1, the assessment scheme for Analysis 1 is quite complicated. We expect students that face the choice between answering questions of either type under time pressure during an exam, will complain. The whole description can be clarified. A final grade for the course should also be awarded after the exam, and the weights .07 and .03 should be multiplied by a factor 10. For the Programming part in Modelling 1, object-oriented programming may be described better, as OOP is probably not what was intended here.

In Module 3, the description of Probability Theory is a stub. We believe it is useful to expand to provide more information.

In Module 4, the ODE course depends on choices made for Systems Theory in M2. Also, the suggestion to put in boundary value problems arising from PDEs has been put at some random place in the description. Hence, we cannot yet consider this course proposal finished. The learning goal and assessment for Modelling 3 related to Programming are vague; efficient and transparent coding should be promoted from the beginning, not only now. A solid ability leaves room for interpretation.

In Module 5, the language R is mentioned in the description for Statistics 1. We believe it is good to mention in the description that R is the language of choice in the field of statistics. That will show why this is taught next to Python. It might be helpful to specify in the first learning goal what standard estimators are included.

The course Analysis 3 is yet unfinished. An old description of Vector Calculus is used, while the course deals with metric spaces too.

In Module 6, the learning goals of Optimization are not well formulated. It is hard to understand what is tested with "explain" and "describe" as these are vague terms. The use of "understand" for

Optimization Methods and Neural Networks should also be changed to a formulation that is useful for testing purposes.

In Module 11, the course Introduction to PDE has no description yet. We note that adding the learning goals improves the current situation. However, we also note that there has been some discussion in earlier meetings in relation to the master course Numerical Techniques for PDE, and regarding workload. Also, the pre-knowledge from ODE is not yet clear. Hence, we believe this course description requires improvement.

Also, presentation skills are not taught anywhere in the curriculum, which we feel is a serious omission.

Finally, we remark that the text could use some careful editing. Our observations include the following, but are not limited to,

M1-Analysis 1; Taylor's series -> Taylor series

M1-Modelling 1; learning goal 1; "the model in report" --> "the model in a report"?

M2-Modelling 2; prime objective (...) "is"

M2-Modelling 2; last goal "pairs of two students" is a tautology.

M3-Modelling 3; above a.: python -> Python

M3-Modelling 3; assessment mentions "basically" which we suggested before should be removed.

M5-Reflection 1; line 1/2 "tatistics"--> statistics and "vectorcalculus" --> vector calculus

M6-Statistics 2; bootstrap --> bootstrap.

M6-Statistics 2; Finallyu --> Finally,

M6-Statistics 2; The last lines read better with the following:

However, in, for instance, time series, this is no longer the case, and one should be aware of the consequences. The introduction of these theoretical concepts is roughly 75% of the course. The remainder of the course focuses on applying these techniques to real datasets using the language R.

M6-Optimization methods; description used "is studied" in one sentence twice.

In summarizing, we feel that the regulations need improvement before we can agree. In addition, for the curriculum, we feel that there are still major hurdles to be overcome though these are not impossible to fix. Therefore, we give a negative advice for the proposed bachelor EER. We note that a concrete learning line consisting of three courses (ST,ODE,PDE) with serious flaws and that has not been discussed with teachers at all raises concerns regarding the feasibility of meeting deadlines before the summer holiday.

Best regards,



Hil Meijer
Chair PC-AM