

Math Students Round Table Feedback Report

1 Minutes of the Meeting

In this section, the meeting is documented. The below feedback is presented (more or less) unfiltered and unsorted, the points are taken in chronological order of the meeting. A discussion of the feedback with the main points to be changed, can be found in section 2.

Attendees: Colin, Malte, Scott, Alina, Maria, Takundei, Abhik, Prabhat, Kendra, Steffen, Mikhail, Daniel, Marco, Aiman, Deepak

Meeting Place: Nordmetall Servery, 2:15

1.1 Info Points:

- 1) Purpose of the round table
- 2) Coming changes of the module system

1.2 Feedback:

- 3) Feedback about courses per year:
 - A) 1st year:
 - (i) Math software lab is useless, if say Mathematica skills are needed, teach them on demand
 - (ii) Want 7.5ects for analysis I
 - (iii) Mandatory tutorial, in which problems are solved together (perhaps as an option)
 - (iv) Also, helps the students checking themselves
 - (v) Analysis II: Currently, homework was too computational
 - (vi) Have advanced linear algebra/introductory linear algebra
 - (vii) Levels of linear algebra: matrix algebra (applied), foundations of linear algebra (medium), introductory linear algebra (advanced)
 - (viii) Second part of linear algebra in second semester (additionally to what is taught now), like at other German universities
 - (ix) Undergraduate seminar was very good
 - (x) Perhaps something similar in 6th semester
 - B) 2nd year:
 - (i) More ects for elements of stochastic processes, remove elements of probability from math study program
 - (ii) Real analysis is taught too slowly currently
 - (iii) Complex analysis is fine
 - (iv) Switch algebra and topology (4th vs. 3rd semester)
 - (v) Calculus on manifolds should be in 4th semester as well

- (vi) Numerical methods should be more computational (and using programming)
- (vii) Applied core math module is fine
- C) 3rd year:
 - (i) Not allowed to take non-major specialization classes
 - (ii) Not enough courses in 5th semester
 - (iii) Idea: offering classes that can also be taken by masters/physicists, ...
 - (iv) Better advice to students regarding specialization classes
 - (v) Problem: no master. program
 - (vi) Want more specialization classes
 - (vii) Introductory Topology: second part was too quick and hand-waivy, why are smooth manifolds needed in topology, more about covering spaces
 - (viii) Going in direction of algebraic topology
 - (ix) Number theory: good, controversial: not really specialization class
 - (x) Calculus on manifolds: good
 - (xi) Differential equations: currently not taught well, too unstructured
- 4) Triangle classes:
 - A) Why are there no math triangles, like number theory. for anyone, math and politics
- 5) General issues with teaching:
 - A) Some professors should be more open minded/careful when making comments about students nationalities
 - B) Grades are published late
 - C) Not enough classes in math, campus track need to take non math core module
 - D) Therefore, it Would be nice if students were allowed to take other specialization/master classes instead of a 4th core module
 - E) TAs are only given SA contracts and not enough hours, also too little guidance
 - F) Under representation of females in math department (faculty)
 - G) Want lecture notes for all lectures
 - (i) Suggestions: readings for each lecture announced
 - (ii) Even better: Lecture notes:
 - Either by professor
 - Or by a notes-taker (student), being payed and getting credits for it
- 6) Not enough information about thesis work and expectations for thesis
 - A) Deadlines depend on supervisor
- 7) Better options and advertisements of current options for World track
- 8) Better info/communication from faculty in general
 - A) Module coordinators are not accessible

2 Discussion of the feedback

In this section the feedback will be discussed and suggestions of improvements of the math study program, will be presented. We will start with class specific feedback, then discuss general feedback and finally suggested changes of the undergraduate math program structure. Finally, the author will give some meta feedback about the round table.

2.1 Class specific feedback

Positive feedback There was positive feedback and satisfaction about the following classes/modules:

- 1) Undergraduate seminar: Generally well taught and a nice opportunity to practice presentations of mathematical work. Still also interesting content wise, the class gave a opportunity to cover some basic mathematics knowledge otherwise not covered in the study program.
- 2) Analysis II: A good class and well taught, but it should receive more credits corresponding to the high but necessary workload
- 3) Complex Analysis
- 4) The applied core math module
- 5) Number Theory
- 6) Calculus on Manifolds

Negative feedback There was negative feedback additionally to the classes mentioned below, that should be removed completely from the study program:

Real Analysis Currently taught too slowly, last year was too quick

Introductory Topology The second part was too fast and hand-waivy, additionally too much time was lost teaching background of smooth manifolds, as opposed to e.g. teaching covering spaces in more detail and slower. Also some students lacked the background in Manifolds and (to some degree) Algebra.

Numerical methods Here programming should be used to implement the methods taught, specifically in homework exercises. Currently, everything is done by hand this is very tedious, restricts the questions in homework and exam (in order to remain feasible) and puts too much emphasis on the computations as opposed to conceptional understanding.

Differential equations Currently the class is too unstructured.

2.2 General feedback

Furthermore, there were a number of general complaints and suggestions brought up:

- 1) There is an under-representation of females in the math department (faculty)
- 2) Some professors should be more careful, when commenting on student's origins
- 3) Grades are often published late
- 4) TAs are currently only given SA contracts and SAs/TAs generally receive not enough hours (less then they are spending)
- 5) Also TAs receive too little guidance
- 6) The communication from faculty should be improved in general
- 7) In particular, the module coordinators were hardly accessible this semester
- 8) There should be lecture notes or at least announced pre-readings for math classes

2.3 Suggestions for changing the math study program

The following changes have been suggested:

2.3.1 First year structure

Mathematical software lab Should be probably removed altogether. Mathematica skills are not useful for students, which are often not using Mathematica afterwards anyway (licenses are very expensive). If skills in a programming language are needed for a different class, they should be taught on demand.

Analysis I Give 7.5 ects for it, this is more appropriate for the workload (which is absolutely necessary for the students to understand the basic concepts).

Advanced linear algebra There should be an additional advanced linear algebra class (similar to the current introductory linear algebra in the third semester). This advanced linear algebra class could be a alternative to the other linear algebra classes and should be mandatory at least for math and physics students. This way, linear algebra classes could be treated similarly to calculus with its different levels already existing. Then, also the class introductory linear algebra in third semester and foundations of linear algebra in the second semester would be redundant.

Advanced Linear algebra II This class would continue Advanced Linear Algebra I in the second semester. This is also the way linear algebra is taught in most public german universities.

2.3.2 Second year structure

Elements of Probability This class should not be part of the math study program, it aims at a different audience and the pace of the class is thus too slow for math students.

Elements of stochastic processes Instead this class (already including all the content from Elements of Probability) should receive 5 ects.

Introductory Algebra and Introductory Topology/Calculus on Manifolds Currently Introductory Algebra is taught in fourth semester and Introductory Topology/Calculus on Manifolds (alternating) in third semester. Instead Introductory Algebra should be taught in thirs semester and Introductory Topology/Calculus on Manifolds should be taught in fourth semester.

Triangle classes There should be more math triangle classes.

2.3.3 Third year

Project and Thesis Students generally don't receive enough information about thesis work. In particular, deadlines and expectations are not communicated well and depend too much on the supervisor.

World track There should be more and better options for World track, the existing options should be better advertised.

Campus track There are not enough math classes, so Campus track students are forced to take a non-math core module. It would be nice if students were allowed to take more specialization or graduate classes instead of a fourth core module, when choosing Campus track

2.3.4 Discussion

Here the main points are removing the math software lab and giving more credits to Analysis I, replacing Foundations of – and Introductory Linear Algebra, by two 5 ects advanced linear algebra classes throughout the first year and to remove Elements of Probability and instead give 5 ects to Elements of Stochastic Processes, having two class slots per week, instead of just one. Also, the order in which students take algebra and Topology/Calculus on Manifolds should be changed. Overall, these changes amount to one additional class of 5 ects to be taught (the second linear algebra class) and furthermore move 5 major-related ects from second to the first year, however the overall amount of major-related credits remains the same. These changes are needed however, in order to ensure that math students learn prerequisites, before taking classes requiring them and could also be useful to students in other majors. Particularly, offering the proposed additional class "Advanced Linear Algebra I" following the same idea that lead to establishing different difficulty/abstraction levels for the calculus classes, can be useful at least also for physics students. This is also the way linear algebra is taught at most German universities. Finally, these changes would help better matching the credits received for classes to the actual workload and to better balance the math education across different areas of mathematics.

2.4 Meta observations

In this subsection the round table will be discussed as a method of gathering feedback from students. Overall, the round table was successful. Although only a minority of math students attended the round table, there were at least two students in each year as well as further students from other majors (mostly physics), taking the math classes. The feedback was very extensive, however still somewhat detailed discussion were possible. In particular, compared to the author's experience in the round table last year, there were both more and more constructive feedback as well as more student participating in the round table (partially due to the fact that now also first year students were invited). Also, it proved to be useful to invite not only math students and to invite first year students. Therefore, the author wants to suggest these student organized round-tables as a useful addition to currently used ways of gathering feedback.

On behalf of the
Academic Affairs Committee
Undergraduate Student Government

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