PUBLISHED COURSE ANALYSIS

Publishing date: 2020-02-17

A course analysis has been carried out and published by the course convener.

The Karlstad University evaluation tool is owned by the Professional Development Unit and is managed by the systems group for educational administration.

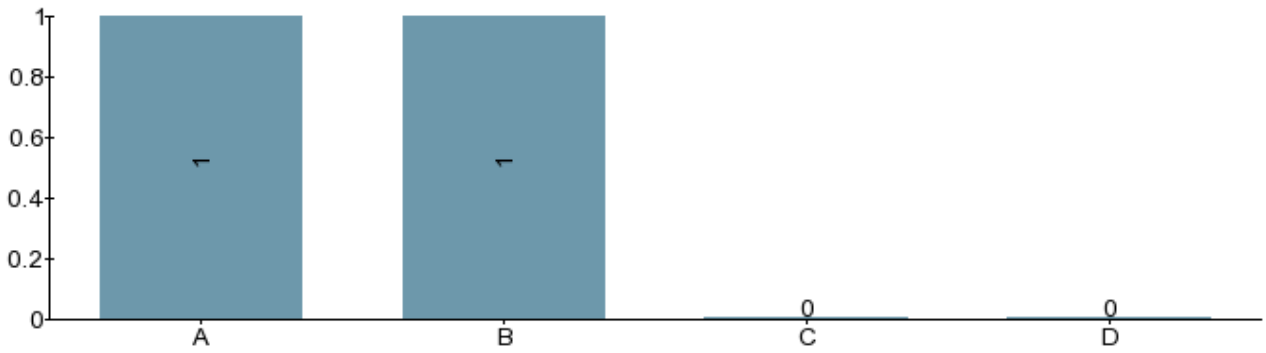
Homogenization: multiscale modeling, analysis and simulation, 7.5 ETCS cr. (MAAD28)
Course convener: Adrian Muntean

Basic LADOK data	
Course Code:	MAAD28
Application Code:	34562
Semester:	HT-19
Start Week:	201935
End Week:	202003
Pace of Study:	25%
Form of Study:	Campus

Course Data	
Number of questionnaires answered:	2
Number of first registrations[1]:	2

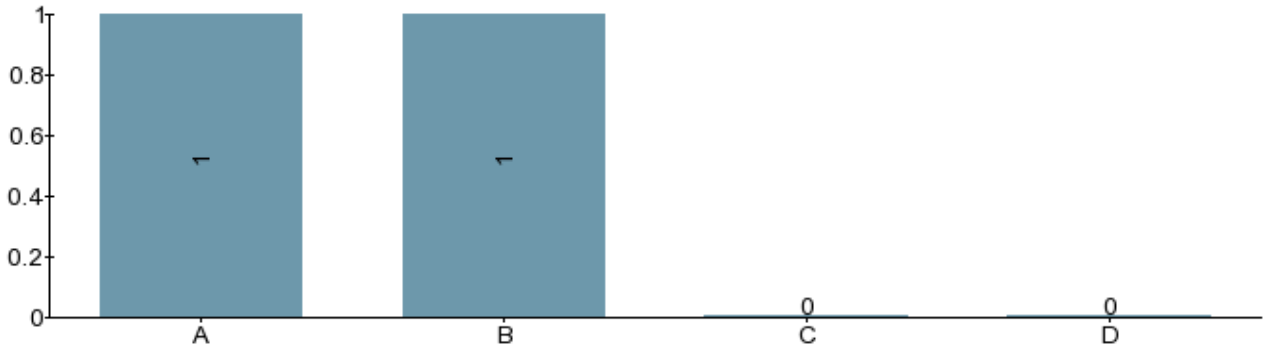
Changes suggested in the course analysis of the previous course date:
This course was a "premiere" at KAU.

1. The contents and structure of the course has supported the achievement of the learning outcomes



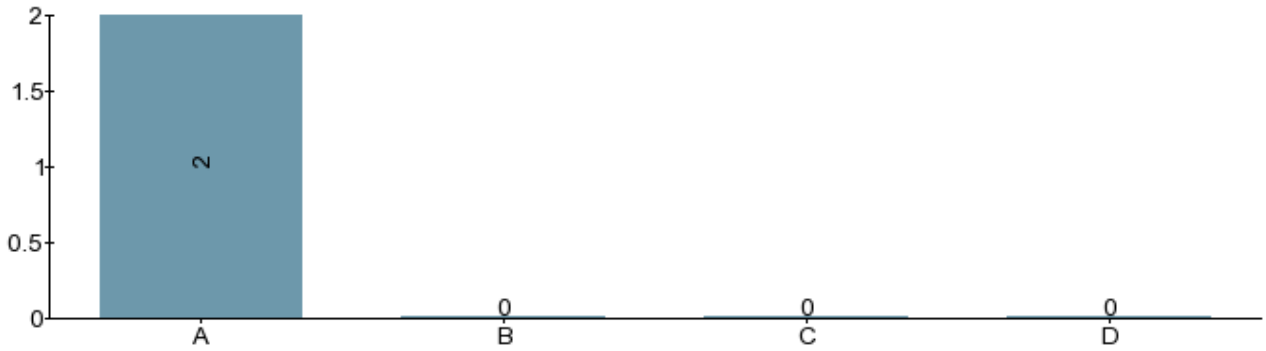
A) To a very large extent
B) To a large extent
C) To some extent
D) To a little extent or not at all

2.The assessments included in the course have given me the opportunity to demonstrate my achievement of the learning outcomes



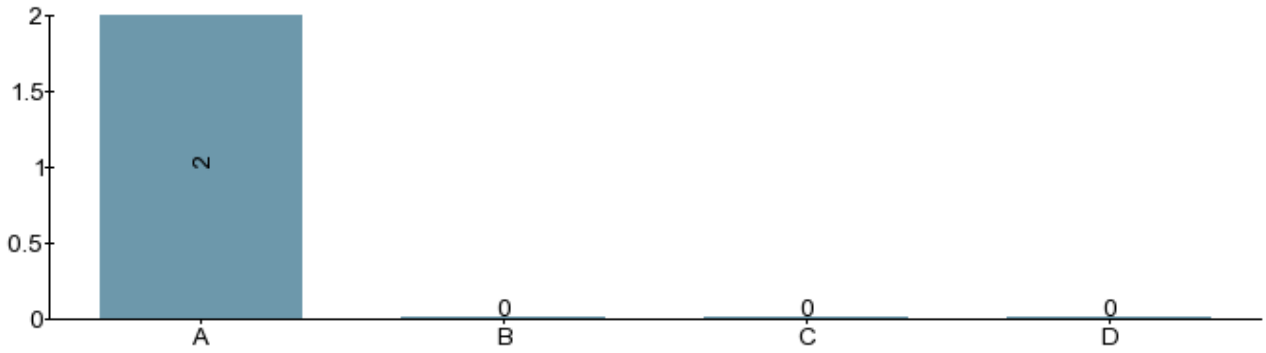
A) To a very large extent
B) To a large extent
C) To some extent
D) To a little extent or not at all

3. My workload (including scheduled activities and independent work) during the course has been



A) 40 hours per week or more (or 20 per week or more for courses given as half-time studies, 10 hours or more fo
B) Between 30 and 39 hours per week (or between 15 and 19 hours for courses given as half-time studies, or betv
C) Between 20 and 29 hours per week (or between 10 and 14 hours for courses given as half-time studies, or bet
D) Less than 20 hours per week (or less than 10 hours per week for courses given as half-time studies, or less tha

4. During the course, I have experienced the reception from teachers and other staff as professional



A) To a very large extent
B) To a large extent
C) To some extent
D) To a little extent or not at all

Analysis based on course evaluation, including comments fields. If information has been collected in other ways, it

should also be analysed here. Any effect of joint courses should be commented on.

The homogenization topic is at the border between PDEs (partial differential equations), functional analysis, and asymptotic methods. Topics like the Lax-Milgram lemma, proving parameter independent bounds , compactness, extension theorems, are key analysis aspects for the needed mathematical technology... Hence, they deserve a special attention, and yes, specifically, much work is done at the level of PDEs before being able to apply homogenization techniques. Since we wanted to study the upscaling of selected PDE structures, many functional analysis steps were not detailed due to time constraints.

The role of the projects is to allow the student to come quickly to approachable research-relevant questions where independent work cam be done towards foreseeable/reachable results. On the other hand, the role of the exam is more scholastic - it has to emphasize whether the student is able (or not) to apply correctly the homogenization technique for a PDE problem form the "beginning till the end". So, the student has to deliver a comprehensive picture, with a sufficient level of details.

Suggestions for changes to the next course date.

Due to the lack of sufficient training in measure and integration theory as well as in functional analysis of the KAU students, some more theoretically-oriented homework will need to be indicated. In this spirit, maybe a lecture on the proof of the 2-scale compactness theorem can indeed be offered. Finding a proper textbook is not an easy task. Existing materials are either research monographs or advanced scientific articles. One way out is to expand further the existing booklet on homogenization with further functional analysis details, solved homework exercises, and some more elementary rigorous proofs involving asymptotic techniques for PDEs.

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1. **Number of first registrations for a course:** First registration = the first time a student registers for a specific course.