Teaching Portfolio

Lars Duggen
Institut for Mekanik og Elektronik
SDU Mechatronics (CIM)
E-mail: duggen@sdu.dk
Telefon: +4565501640

Portrait

My name is Lars Duggen and I work as an Associate Professor at the Mads Clausen Institute (MCI). Specifically I work with mathematical modeling of mechatronic systems, including piezoelectric actuators and electric machinery. I have been engaged in teaching from rather early on, starting on my own courses during my first postdoc period. Since then I have been teaching linear elasticity, fundamental control theory, and electric machinery as well as piezoelectricity to both bachelor and master students.

Teaching CV

2020-present	Control Engineering 2, 4th+6th semester BSc
2020-present	Mechatronics Design and Build, 2nd semester MSc
2019-present	Discover the Mechatronics Development Process, 1st semester Bsc
2017-present	Linear Elasticity, 5th semester BSc
2017-2019	Computer Aided Engineering, 4th semester BSc
2017-2018	Mechatronics semester project, 4th semester BSc
2018,2020	Mechanical semester project, 4th semester BSc
2016-2018	Project in Mathematical Modeling, 3rd semster MSc
2015-2018	Electromechanics, 2nd semester MSc
2014-2016	Control Engineering 6, 6th semester BSc
2013-2016	Control Engineering 5, 5th semester BSc
2011-2015	Mechanics 2, 3rd semester BSc

Experience on course design

2015	Electromechanics
2015	Semesterproject for mechanical and mechatronics profile
2017	Redevelopment of Cyber Physical Systems profile

Study administrative tasks

2018-present	Study Coordinator for mechatronics programmes

Formal and informal teacher training

2018-2019	Internal supervision for Lecturer Training Programme
2015	Participation in the Lecturer Training Programme at the University of Southern Denmark

Teaching Philosophy

General observations

Teaching at university level involves the communication of knowledge to students with a vastly different knowledge basis. Specifically at engineering studies, which is my only experience thus far, the skill set of students differ significantly; some being practically skilled while others have better theoretical skills. At the master level, the discrepancy in skills can be very pronounced.

My approach thus far has been to require the students to obtain a certain minimum amount of knowledge and skill in order to pass a course, making this amount very clear to students.This already starts with the immediate presentation of the

course description in the first lectures. More specific, during the course I would start a lecture by deriving and showing equations and concepts with classical, frontal teaching at the blackboard. This element is rather formal and can include - for students - quite abstract concepts. This will take about half of the lecture and is followed by examples where the concepts and derived equations are demonstrated in relatively simple form. At this stage I will point out to the students, that I expect them to be able to solve this type of problems in order to pass.

In addition to the frontal teaching I make use of mandatory hand-in assignments, although not being very strict on passing level - again I think it is the students responsibility to get the most out of a course (if the exam form is passing of assignments only, I am of course more strict). The mandatory assignments are usually a mix of one or two simple exercises and one quite difficult exercise relating to a realistic problem. Here I also make it very clear to the students that I am open to questions and discussions in the solutions process. From general student feedback I have the impression that the students like this approach, as it demonstrates, even though simplified, how the course topics can be used in engineering applications.

Role of Group work to Activate Students

Even though frontal teaching is a significant part of my teaching style and philosophy, I am also very aware of the fact that learning is a process that needs time and active participation. Therefore I do encourage the students to interrupt me at any time if there are questions during my lecturing, and I always let exercise sessions be a part of the lecturing. The exercise parts can be either plain exercises or small lab sessions where the students are supposed to test their newly acquired knowledge. The exercise sessions are following immediately after the lecture (depending on the time schedule that can be after 45 minutes or max 90 minutes of lecturing with a break in between). This way I can still refer to the contents on the blackboard and students have the possibility to grasp what they have just heard about, rather than having to re-work everything on their own at home.For smaller classes at higher semesters, I tend to employ a random procedure to pick a student to solve and exercise on the blackboard, activating them and having them explain solution steps in their own words. This gives me the opportunity to correct them if I see misconceptions and it gives the other students the opportunity to hear topics explained from a perspective usually closer to their own. This does not always work well immediately with all students, but especially in smaller classes they get used to the atmosphere; and I do believe it is important for an engineer to be able to present his/her results to their peers.

E-Learning Tools During the Lecturer Training program I have tested the use of Wiki's to facilitate group works. I tend to believe that this is a very suitable method of having students present their work while not being in the situation of standing in front of the whole class. I have found this to be quite well working for larger classes of about 35 students. It is important to let the students know/feel that their created solution-sites are actually looked at, which I guarantee them I will do, and demonstrate by leaving a comment to each Wiki page.Finally I will use classroom response systems about 3-4 times each semester in order to both foster discussion and make the students aware of their knowledge level. This includes rather general questions or questions that can easily be calculated without any electronic help within about a minute. I do prefer the classical, hand-out response systems opposed to online systems as e.g. Shakespeak. The reason is two-fold: firstly there is the dependence of a stable internet access in order to conduct online surveys, and the other is the simple effect of "know something happens". Just the hand-out of the clickers activates the students differently than a call to "pick up your phones" - the clickers are more palpable... more special (at least that is my impression of the students). I have also started to use them in oral evaluations, which results in much improved discussions after the 3-4 standard questions (e.g. "How is the speed of the lectures: too slow, fitting, to fast"), and one can actually keep statistics on the oral evaluations - where there typically are more students answering than semester-final written

evaluations.As addition to the above, the Covid19 crisis and related university lockdown has forced me to improve my skills using e-learning tools. Here the focus was more on asynchronous teaching by videos; and during this time I have improved both my technical skills (using appropriate hardware etc.), but also pedagogical skills in terms of using recorded videos like pencasts, interactive questions between these videos, and supply the videos by online meetings - both for academic questions, but also getting immediate feedback from the students. For the future I will try to integrate this type of learning slightly more into the teaching as a flipped classroom approach.

Personal Teaching Values

Aside from the technical/procedural aspects of my teaching, I do hold some core values as a teacher. Overall I do believe that it is important to have the students know what is expected of them in an exam situation and that it is their responsibility to learn this (Principle of Alignment). At the same time I make it clear that I am there to help, but they have to actively ask for it. However, I do think I could improve on this part, maybe even by preparing rubrics for the students, for them to have an even more clear understanding, and a document to go to if still in doubt.Other than that, at the second residential of the Lecturer Training Program, we had a task to select some keywords/phrases (out of a set of given keywords/phrases) according to which fit our philosophy, which did not, and which aspects we could be curious about. Without digesting into details of each selection, I would like to highlight a few of the selections. First and foremost the top selection: I do think it is essential to be authentic as a teacher. This is directly related to the "Using Humor in Class" - selection. While the class itself is not about the teacher, being honest with students brings a certain trust that makes the teaching process much more effective, easier, and enjoyable for all parties. While maybe not possible to classify specifically, there are multiple components to being authentic in front of a class. One central part is the possibility of being spontaneous and possibly solving silly examples in order to answer students questions. One instance that I still have in mind was a question a student had about gravitational pull, where we ended up calculating the travel time from central Europe to Australia if traveling through a hole drilled through earth (and vacuum-pumped). Another aspect is the willingness to take a few moments to think about an answer - also as a teacher. Accept and admit that we do not always have immediate answers ready, and lead by example in trying to work out an answer together.Finally, what I might want to look into further is the "Emotionally Safe Environment" part. As mentioned earlier, I do want students to solve exercises on the blackboard, and some students are clearly uncomfortable with it. Here it would be interesting to get further information about possible techniques to create a more safe environment for the students in order to help them improve their presentation skills.