Henrik Wenzel
Institute of Chemical Engineering, Biotechnology and Environmental Technology
SDU Life Cycle Engineering
Postal address:
Campusvej 55
5230
Odense M
Denmark
Email: henrik.wenzel@kbm.sdu.dk
Fax: 65507454
Mobile: 27787374
Phone: 65507374

Employment

Department of Green Technology (IGT)

Odense M
1. Mar 2025 → present

Professor
SDU Climate Cluster

Odense M, Denmark
1. Aug 2024 → present

Professor
SDU Life Cycle Engineering

Odense M
1. Mar 2025 → present

My record of teaching and education development

My record of education and teaching activities for the period of 1986 and onwards comprises the development and operation of full education programs and the development and teaching of individual courses at bachelor, master and PhD level as well as post graduate courses. Main activities have been at SDU and DTU, but also at other Danish and foreign universities. My track record comprise:

- I have been main responsible for or contributing to the development and operation of 5 full education lines on graduate and post graduate (PhD) level

- I have been main responsible or co-responsible for the development of 16 individual bachelor, master, PhD level, and post graduate level courses

- I have been teaching at 29 different individual courses within most topics of Environmental Engineering and many in energy system engineering as well

I have covered most topics and disciplines from conventional wastewater treatment and control and solid waste management to system analysis topics of Life Cycle Assessment and Energy System Analysis disciplines and to Design oriented topics. My main field is within the disciplines of Environmental System Analysis.

Philosophy and strategy for education development and teaching

Our Environmental Engineering education at SDU has an ‘Environmental System Analysis and Design’ profile. It means that it is not a conventional Environmental Technology education focusing on treatment technologies for wastewater, flue gas, ground water etc., rather it has a more proactive and systems perspective, within which students learn how to deal with the sustainability dimension of engineering in a scientific and professional manner.

Having this profile, the disciplines taught at the education are relevant for several other education lines, and over time we have also integrated across educations at the Faculty of Engineering at SDU. Today, we have several joint courses with Energy Technology, Integrated Design and Sustainable Product Development and more is on the way through newly enhanced mutual effort for collaboration with the Department of Technology and Innovation. For us, this is very attractive being both close to our mission and economically beneficial as a way to ensure a sufficient number of students on our courses.

In time, we hope to develop as the anchor of a cross-cutting vision of ‘Engineering for Sustainability’ at the faculty and to support SDU in taking a leading role in achieving the United Nations’ Sustainable Development Goals. Our longer term vision is to be seen by future students as a leading university and a leading education on the dimension and discipline of ‘Engineering for Sustainability’.

We have, thus, several key courses with a significant number of students, i.e. often 60 students and up to 80-90 students on some of our key 10 ECTS flagship courses like the Life Cycle Assessment and the Eco-efficient Engineering courses, while on the smaller courses, we can experience down to 10-15 students. But we manage to develop towards avoiding the very low populated course teaching, and in all, our education ensures a significant profit.

Teaching philosophy

It was never very inspiring to get a lot of answers to questions, one never posed. During my own education, which was Chemical Engineering at DTU (named DTH back then), the teaching was ‘old school’, i.e. long sessions of monologues in 200-student classrooms, especially for the first half of the education. I really missed that someone could show me the problem first. Later, seven years into my career around 1989-1990 at my employment at VKI, I went back and took a single course at DTU again – within a highly profiled topic that was relevant to my work – ‘Teoretisk Vandhygiejne’, which was a flagship course of the Department in question. I was a different student, then. I followed everything enthusiastically and learned everything there was to learn on the topic, because I had felt the urge of needing answers through being challenged in my seven years of career till then.It is, of course, difficult to provide the students with the equivalent of seven years of career challenges, before we teach them. We must, however, try and strive to give the students challenges and problems hand-in-hand with the knowledge, theory, methodologies and tools, we teach them. This was already my philosophy and ambition at my time at DTU, and it was underlying all the teaching and courses, I developed there. When I developed and ran a new course on ‘Sustainable Production’ in 2000, I engaged six different companies and had their environmental managers or their Heads of product development come to the course, give a talk, specify the project task for the student groups, and ‘employ’ the students for the project during the course – they even got a ‘contract’ with the company’s signature, and a visit to the company as one of the first sessions. It was heavy to administrate this level of ambition, but the level of enthusiasm it created with the student was amazing and worth the effort.I was, therefore, pleased to learn the so-called DSMI model of the Faculty of Engineering at SDU, building on problem-based learning and project work in teams. Today, all our courses in the Environmental Engineering education are based on this – and integrated/supplemented with individual exercises and assignments to ensure the personal development of competences and skills.In 2017, I took the task of re-designing our 10 ECTS M.Sc. level Life Cycle Assessment course, which is a key course for many subsequent courses and a flagship of our education. The course is followed by both the environmental engineering students and the energy technology students, and typically around 60 students follow the course. With this number of students, variations and dynamics must be well designed into the course plan, but also a high degree of stringency in communication of the points and messages and the methodological steps of a quite complex and comprehensive methodology like Life Cycle Assessment, otherwise many students will be ‘lost in translation’. I designed the course around a template for each 4 hour session:•Start with a student recap with presentation of the assignment from last time – including a recap of the stuff learned last time and the solutions/answers to the tasks given in the assignment•A plenum Q&A following the recap•A theory lecture – typically 30-45 minutes•An exercise or two on the topic of the theory lecture•A plenum wrap up of the exercise•A second theory lecture•An exercise or two on this topic•A plenum wrap up on this•Presentation of the assignment for next timeIn between, of course, some breaks – typically two breaks of 10-15 minutes each. The exercises are done in the project teams or individually, as it fits. The combination of exercises and theory lectures is made in a way that strives to expose the students to the problem or question, before they get the ‘answer’ in terms of a specific methodological element/step. LCA methodology consists of very many rules and steps, and each of them is there for a reason, i.e. to prevent mal-conduction, avoid pitfalls, etc. In the course now, we often give the students an exercise potentially leading them into a pitfall, discuss the pitfall in plenum, and then subsequently teach the theory and method of avoiding the pitfall. The assignments can both be part of the general theory and knowledge of the course curriculum, i.e. such parts that are fit for student peer education, and part of the project work itself, i.e. the assignment addresses an element of the whole LCA of their own case. The groups get the case study for the team work very early (2nd session). In this way, we assure progress on the case work all way through the course, and we ensure that every methodological step of the LCA (which otherwise may have a tendency to be tedious to relate to) is seen as directly relevant to their task. Moreover, the students are engaged to do peer review of each other’s case works as they develop.Students select their case study from a pre-defined list. We strive to have host companies/stakeholders on each case topic, and the students are put in contact with these from the beginning and get the opportunity to communicate with them and understand the perspective of the stakeholder in question and if possible get some wishes/specifications for the LCA. We have now run the course with this design for the first two semesters now, and we believe that it has been a success. I enclose the course plan of the course in the end of this document.

Contribution to development of full educations

I have been responsible for and/or contributed to the following development and operation of full educations:

- I have been Chairman of the Energy and Environmentally Efficient Technologies PhD program at SDU since 2007

- I am main responsible for the development of the M. Sc. educational program in Environmental Engineering at SDU, and I am member of the educational board of this education

- I am co-responsible for the development of the B. Sc. and M. Sc. educational programs in Energy Technology at SDU and was involved in this since the beginning in 2010-2011. I am member of the educational board of this education

- I contributed to the development and maintenance of the Environment Engineering education line at DTU

- I contributed to the development of the 'Technical Environmental Manager' (Teknisk Miljøleder) post graduate education at DTU around 1995-1996.

Track record of student supervision & evaluation – PhD student and post docs students

I have supervised and co-supervised a total of 16 PhD students and 6 post docs and been engaged in 19 external PhD evaluation committees in Denmark, Sweden, Germany, Great Britain, South Africa, The Netherlands, and Italy.

Student supervision, research integration and synergy

I like very much the interaction with the students and the mutual inspiration, it leads to, and I have given high priority to attracting student thesis projects on both bachelor and master level. With the right integration into my/our running research projects, this creates high synergy and benefit for both the students and us and the companies and other stakeholders, we work with. Further, it ensures an early match-making between students and companies/stakeholders for the subsequent integration of students into the job market. I have had some success with furthering the best student projects to be published as journal articles.

During my career, I have been main supervisor of a total of around 150 bachelor and master thesis students within both Environmental Engineering, Chemical Engineering and Energy Technology educations. This number breaks down as follows:

•M. Sc. Environmental Engineering40
•B. Sc. Environmental Engineering27
•M. Sc. Chemical Engineering8
•B. Sc. Chemical Engineering13
•M. Sc. Energy Technology26
•B. Sc. Energy Technology36

It has been a great pleasure to engage in the Faculty's Energy Technology education and since 2014, I have been much involved in supervision of energy technology thesis students. I have had the pleasure of hosting most of these students, around two thirds of them, and we have had great benefit and synergy through their projects on topics directly relevant in our Energiplan Fyn program, including the Funish energy companies and other stakeholders hosting these projects. Several of the students have subsequently got a job with these stakeholders.