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## Summary

At the University of Southern Denmark (SDU), I am involved in teaching at both the bachelor's and master's levels. For bachelor's students, I have delivered courses in Basic Biochemistry, Microbiology, and Applied Statistics. On the master's level, I have designed a new compulsory course for the Master of Chemical Engineering and Biotechnology program. This course, titled "Transport Phenomena", covers the fundamental principles of momentum, heat, and mass transport. While the subject of transport phenomena is a standard component of chemical engineering education worldwide, I have tailored this course to align with our unique Chemical Engineering and Biotechnology program at SDU.

The course aims to enhance students' abilities in problem formulation and in devising analytical and numerical solution strategies. Additionally, it includes training on COMSOL Multiphysics, equipping students with the skills to solve more complex problems numerically.

## Pedagogical View

As an educator in an engineering discipline, my primary objective is to cultivate students' critical thinking and problem-solving abilities. To achieve this, I use constructive alignment in my courses to design lecture content, assignments, and evaluation methods. My teaching approach emphasizes research-based learning that addresses real-world challenges. To accomplish this, I concentrate on creating cohesive course content that incorporates the most recent advancements in my field and traditional educational resources.

I am committed to fostering an inclusive and engaging learning environment that caters to a variety of learning styles. I aim to establish an open and approachable atmosphere that encourages student-teacher interaction and provides constructive feedback to stimulate student motivation.

## Pedagogical Training

I have completed the Lecturer Training Programme (LTP) offered by the SDU Centre for Teaching and Learning. The training program consists of five modules covering various topics related to pedagogical training. The core of the training program was a pedagogical development project. The project I chose was to introduce blended learning in a mathematical intensive course that is otherwise taught in class. I used MATLAB Grader to develop online exercise materials for the undergraduate course titled Design of Ideal Chemical Reactors.

During my PhD, I had the opportunity to enhance my pedagogical knowledge through a mandatory course, UCC 601 Teaching at a University Level. This course aimed to prepare PhD candidates with the necessary skills for delivering high-quality university-level education. The course highlighted the shift from being a graduate student to becoming an effective educator, necessitating theoretical understanding and practical application of pedagogical theories. The coursework involved tasks such as creating a well-aligned course design for effective teaching and learning, formulating appropriate course learning outcomes using the principles of constructive alignment, evaluating the criteria for assessing teaching and learning experiences in relation to learning activities, assessment tasks, and rubrics, and pinpointing methods to improve the quality of teaching.

## Teaching Activities

### Basic Biochemistry and Microbiology

Ashraf, M. T.  
01/02/2022 → 30/06/2022

### Design of Ideal Chemical Reactors

Ashraf, M. T.  
01/09/2021 → 31/01/2023

### T210051101: Industrial Fermentation and Modelling of Bioprocesses

Karring, H., Bastidas Oyanedel, J. & Christensen, K. V.  
01/02/2020 → 30/06/2022

## **Transport Phenomena**

Ashraf, M. T.  
01/09/2023 → ...

## **Supervision**

**Developing and validating a mathematical model for biomethanation in a biotrickling filter reactor**

Ashraf, M. T. & Yde, L.  
01/09/2021 → 30/06/2022

**Photochemical CO<sub>2</sub> Capture and Microalgae Production for Value Added Product**

Ashraf, M. T.  
04/01/2021 → 30/06/2021

**Pyrolysis of the solid fraction of biogas digestate**

Ashraf, M. T. & Yde, L.  
01/09/2021 → 30/06/2022

**Thermodynamic state analysis of ex-situ hydrogenotrophic methanogenesis**

Ashraf, M. T.  
01/02/2022 → 30/06/2022