

## Teaching portfolio

### 1. Teaching CV: A list of any lecturing and supervision tasks, including specification of academic fields, scope, level (bachelor, master, continuing education, PhD) as well as any external examiner tasks.

#### Course teaching

1977 - 1992

Worked in industry – many (in excess of 20) in-house and external (international) courses and presentations dealing mostly with the design and performance of heat recovery equipment. The academic level varied from technician to graduate degree level.

#### *Note on course length and ECTS*

In the period 1992 – 1994: 1 ECTS corresponded to 6 lectures

In the period 1995 – 2009: 1 ECTS corresponded to 5 lectures

In the period 2009 – now: 5 ECTS corresponds to between 12 and 16 lectures (150 hours)

Therefore unless otherwise specified 1 ECTS = 5 lectures

#### *Note on academic level*

1. to 6. semester: Bachelor

7. to 9. semester: Master

The following courses were run between the years 1992 to Spring 2016. All of the courses were held a number of times. Unless specified then the author is the sole teacher. The courses were held either through the medium of Danish or English

Advanced Thermodynamics, 7. semester, 1 ECTS

Aerodynamics and Flow, 8. semester, 5 ECTS (8 of 15 lectures)

Applied Numerical Methods, 8. semester, 1 ECTS

Analysis of Advanced Thermal Systems, 9. semester, 5 ECTS (4 of 12 lectures)

Analytical Mathematics and Numerical Methods, 5. semester, 5 ECTS (8 of 16 lectures)

Chemical Thermodynamics and Combustion, 8. semester, 1 ECTS

Combustion and Emissions, 6. semester, 1 ECTS

Combustion Processes, 8. Semester, 1 ECTS

Combustion Technology, 8. Semester, 1 ECTS

Combustion Technology and Chemical Reactors, 7. semester, 5 ECTS (4 of 12 lectures)

Combustion Theory and Modelling, 8. semester, 1 ECTS

Compressible and Potential Flow Theory, 7. semester, 1 ECTS

Computational Fluid Dynamics, 7. semester, 2 ECTS

Design of Thermal Systems, 5. semester, 1 ECTS

Design and Operation of Energy Systems, 9. semester, 1 ECTS (4 of 5 lectures)

Differential Algebraic Equations and Stiff Systems, 9. Semester, 1 ECTS (4 of 5 lectures)

Energy Technology, 1. semester, 1 ECTS (1 of 5 lectures)

Energy Distribution Technology, 7. semester, 2 ECTS (5 of 10 lectures)

Finite Element Theory, 8. semester, 2 ECTS (5 of 10 lectures)

Fluid Mechanics, 7. semester, 2.5 ECTS (7. lectures)

Heat and Mass Transfer, 8. semester, 2 ECTS (5 of 10 lectures)

Heat Exchanger Design and Performance, 5. Semester, 1 ECTS (6 of 6 lectures)

Heat Transfer, 8. semester, 2 ECTS (12 of 12 lectures)

Heat Transfer 2, 8. semester, 1 ECTS

Linear Algebra and Numerical Methods, 7. semester, 2 ECTS

Mathematics, 7. semester, 2 ECTS

Numerical Methods, 7. semester, 2 ECTS (5 of 10 lectures)

Numerical Methods, 5. semester, 5 ECTS (8 of 16 lectures)

Practical Combustion Technology, 9. semester, 1 ECTS (4 of 5 lectures)

Refrigeration and Heating Technology, 6. semester, 1 ECTS

Thermal Fluid Science, 7. semester, 2 ECTS (10 lectures)

Thermal Turbomachinery, 3. semester, 1 ECTS

Thermodynamic Systems and Machinery 2, 5. semester, 5 ECTS (4 of 14 lectures)

Two-Phase Flow, 9. semester, 1 ECTS (6 of 6 lectures)

Two-Phase and Non-Newtonian Flow, 9. semester, 1 ECTS

#### *Ph. D. Courses*

Teacher in the course: "Biomass Combustion and Its Modeling", 24. – 26. October 2011, Course held in cooperation with Chungun Yin and Henrik K. Nielsen

#### *Supervision (B. Sc. And M. Sc.)*

Have been main supervisor or co-supervisor for in excess of 150 project groups or individuals. This number represents in excess of 500 students. The majority of these students were at M. Sc. level.

#### *Supervision Ph. D.*

Supervisor for: Jan Rusås (1993 – 1998) "Numerical simulation of gas-particle flow linked to pulverised coal combustion",

Supervisor for: Christian Brix Jacobsen (1993 – 1997) "Large eddy simulation of confined Swirling flows",

Supervisor for: Jens Ingemann Madsen (1995 – 1998) "Design optimization of internal flow devices"

Supervisor for: Lasse Rosendahl (1995 – 1998) "Extending the modelling framework for gas-particle systems"

Supervisor for: Rikke Kau Byskov (Industrial Ph.D. EF-663, with Grundfos A/S) (1997 – 2000) "Large eddy simulation of flow structures in a centrifugal pump impeller",

Supervisor for: Søren Knudsen Kær (1999 – 2001) "Numerical Investigation of Deposit Formation in Straw-Fired Boilers ",

Supervisor for: Kim Sørensen (Industrial Ph.D. EF-923, with Aalborg Industries A/S) (2001 –2004) "Dynamic Boiler Performance "

Supervisor for: Jon Agust Thorsteinsson (Co-supervised with Inger Bach) (2001 – 2004) "Modelling of Fishing Vessel Operation for Energy System Operation"

Supervisor for: Mads Bang (Industrial Ph.D. EF-895, with IRD A/S) (2001 – 2004) "Modelling of Diffusive Convective and Electrochemical Processes in PEM Fuel Cells ",

Supervisor for: Steen Lauridsen (Co-supervised with Niels Olhoff) (1998 – 2001) " Response Surface based Design Optimization"

Co-supervisor for: Marie Cecilie Pedersen (Industrial Ph.D. with Vattenfall) (2013 - now) " Icing on Wind Turbine Blades"

Co-supervisor for: Jakob Hærvig (2015 - now) "Performance optimisation of Thermal Systems" " Icing on Wind Turbine Blades"

Co-supervisor for: Anders Simonsen (Industrial Ph.D. with Alfa Laval) (2015 - now) " Performance of Marine Based De-Sulphurisation Systems"

#### *Continuing Education and Diverse*

Lifelong Learning course (AAU) August 2000: "Biofuels"

Lifelong Learning course (AAU) August 2001: "Fuel Cell Systems"

Lifelong Learning course (AAU) August 2002: "Introduction to Wind Turbine Aerodynamics"

In-house course at MAN Diesel & Turbo, Fredrikshavn. April – June 2012. In cooperation with three other teachers.

Contribution: 3 of 7 lectures. The participant were qualified engineers and machine technicians

#### *Role as Examiner – both at AAU and other institutions*

Have acted as examiner (in excess of 100) in different forms of evaluation for both B.Sc. and M.Sc. students (under the 12 or 13 scale regimes)

Oral examinations

Written examinations

Semester project examinations

Running evaluations

Have acted as examiner at (in excess of 10) M.Sc. thesis examinations at DTU

Have acted as examiner (Chairman of the Assessment Committee) at (in excess of 10) Ph.D. evaluations at AAU (Aalborg and Esbjerg)

Have acted as examiner at three Ph.D. evaluations at DTU

Have acted as examiner at three Ph.D. evaluations at the University of Stavanger

**2. Study administration: A list of any study administration tasks, e.g. study board membership, head of studies or semester or course coordinator, accreditation, etc.**

Semester coordinator (multiple times) for 7. Introductory Semester  
Semester coordinator for 9. Semester

**3. University pedagogy qualifications: A list of any completed courses in university pedagogy, PBL courses, workshops, academic development projects, collegial guidance and supervision, etc.**

Have completed a one day pedagogic course for Associate Professors (late 1990's)  
Have completed a one day course for Ph.D. supervisors (late 1990's)  
Have completed a one day course for Ph.D. supervisors (28. October 2015)  
Have been the supervisor for four Assistant Professors who have successfully completed the Assistant Professor Pedagogic Course

**4. Other qualifications: Conference attendance, editorials, presentations, etc. relating to education, 'University Teaching Day', etc.**

Have participated in many (in excess of 10) international conferences  
Have attended the University Teaching Day on two occasions.  
Have made an extensive number of presentations at technical seminars, workshops and research project status meetings

**5. Teaching activity development and teaching materials: A list of any contributions to the development of new modules, teaching materials, study programmes, e-learning, collaboration with external business partners, etc.**

Have prepared presentation material, notes, exercises and solutions for the courses that I have been involved in.  
Have been actively involved in the development and preparation of the many (in excess of 5) new and revised educational programmes at the Department of Energy Technology.  
Have had extensive contact with many external, both domestic and international, companies, universities and research institutions.

**6. Teaching awards you may have received or been nominated for.**

Was awarded Teacher of the Year by the Study Board of Energy, 2014

**7. Personal reflections and initiatives: Here you may state any personal deliberations as regards teaching and supervision, any wishes and plans for further pedagogic development, plans for following up on feedback/evaluations from students, etc.**

The availability and dissemination of knowledge is one of the factors which should affect the way we educate engineers in the future. Knowledge is at our fingertips and there will be a greater emphasis on our students' ability to digest and collate this.

Students learn (and have the opportunity to learn) in a different way nowadays and this should be reflected in the way we teach and supervise.

**8. Any other information or comments.**

No further information or comments – the defence rests.