

# Undervisningsportfolio

## 1. Undervisnings-CV: Oversigt over undervisnings- og vejledningsopgaver med angivelse af fagområder, omfang, niveau (BA, kandidat, EVU, Ph.d) samt evt. censoropgaver.

Teaching Portfolio 2015

The teaching portfolio is elaborated according to the recommendations given in "Teaching portfolio for applications to the faculty of engineering and science at Aalborg University". There will be a section relating to the three points stated in the recommendation followed by specific teaching experiences.

### 1. Experience and competence.

- Completed teaching assignments incl. supervision is listed below.
- Forms of teaching: Lecture (power point and blackboard), exercises, laboratory work, mini project, discussions, study trips, visit to companies, informal talks. Supervision is undertaken on both a formal (with agendas, scheduled meetings, status meetings, minutes of meetings) and an informal way (where I have all the daily talks to the students at a much more friendly basis)
- Teaching materials: Available upon request. I have numerous power point presentation series aimed to be of high pedagogical quality. Furthermore laboratory exercises and exercises (problems) to be solved during problem solving time.
- Choices and results: I constantly try to get the feeling of improving the quality of learning for the students. This is carried out in a non-formalized way. I use my sound reasoning and check "What works and what doesn't". Upon request can be shown a 100 page portfolio of student and course takers evaluations from last 15 years. This is without doubt a very positive collection of statements.
- Evaluations: Complete folder with evaluations dating from 1999 is available upon request. Recent evaluation for taught courses advanced power systems 2015 is "The course is very good and well structured. Excellent teaching from especially two of the teachers" and "Very interesting and useful content – highly relevant".
- Statement from study board: Recent from circuit theory course can be seen at last pages of this document.
- Participation: None
- Teaching administration: One of the main originators of the new energy engineering education of dept. of energy technology. Several years of active participation in preparing the best energy engineering education – a task which has shown to be a major success! Member of the external course (ELITE/CPD) administrators group for 5 years. Member of the group restructuring the educations to fit the new 5 ECTS schedule. Have authored numerous course descriptions. Managing the HV laboratory and administration safety issues in HV experiments. Manages the MV laboratory and is appointed "Driftleder" by Sikkerhedsstyrelsen.

### 2. Formal qualifications

- Master's degree and PhD degree is attached this application
- Completed the 2 year (part time) course "University pedagogies for assistant professors with good result. Statements available upon request (Danish).
- Nominated four times to lecturer of the year. Four student projects prize winning, one very prestigious (IDA candidate prize)

### 3. Reflections on teaching

- Articles on teaching: None
- Reflections: 16 years of dedicated and valued teaching at the dept. of energy technology. Teaching at the final semesters is highly research based both the lectures and the project work. Many student master projects have resulted in scientific paper and the students have presented their work at high-quality international conferences.
- Thoughts: I am fully agreeing that the Aalborg model of teaching provides excellent results for the majority of the students, especially the Danish students, which are used to this from the starting years. International master students need somewhat more effort to gain full advantage of the Aalborg model as their background normally is much more traditional.
- Development: I am confident that I am developing towards being a more and more experienced University teacher in both lecturing and supervision. I really feel that I master both the issues of teaching itself, but my many years of experience have made power system matters and electricity so "simple" and heartfelt that I really feel I master sharing this knowledge. This especially relates to the High Voltage courses having experimental exercises. I have developed new methods for conducting experimental work in the HV lab by including a mini-project based on real life power system components which is followed up by a mini-seminar alike a conference where students present their work for each other and assistant teacher and I. This has proven to lead to a very good learning eventually leading to a very high pass rate in the written exam.
- Plans for development: I will (as the former years) continuously keep reflecting upon the development and quality of my teaching. I will try to include more modern means of teaching such as web based remote courses and so on.

Below are listed teaching activities undertaken from 01.09.1999 - present. Selected project works are specified.

1. semester: Supervisor (E-studies) in P0 and P1 project work.
2. semester: Supervisor (E-studies). Course in circuit theory (3 ECTS). Course in DC circuit theory (2011).

3. semester: Assistant teacher in circuit theory I (2 ECTS) and II (1 ECTS).  
 Elaboration of a new pedagogical solutions set for circuit theory.  
 Examiner in project work  
 Assistant teacher in measurement techniques (1 ECTS)  
 Lecturer in AC-circuit theory and Electro physics (2 ECTS)  
 Lecturer in Fundamental circuit theory (DC, R,L,C, 1st and 2nd order differential eq., frequency response, Bode plots, Laplace theory) (2 ECTS) (8 years experience)

4. semester :Assistant teacher in electro technical issues for mechanical engineers (1 ECTS)  
 Lecturer in electro technical issues for mechanical engineers (1 ECTS)  
 Lecturer in electric power systems (line constants, transmission line theory, power flow) (2 ECTS)

6. semester:Lecturer in Distance protection related to Zieglers textbook "Numerical distance protection" (1 ECTS).  
 Examiner EE6 projects  
 Lecturer in Electromagnetism for EMSD6 (Electromechanical system design) (2 ECTS)

7. semester:Supervisor for 10 Bachelor thesis projects within the area of power systems and power electronics.  
 Lecturer in AFundamentals of High Voltage@ (2 ECTS) (16 years experience)  
 Lecturer in AFundamentals of High Voltage@ (2,5 ECTS) (16 years experience)  
 New lecture compendium for HV experiments by P. Reigosa and C.L. Bak  
 Example of BSc project: Investigation of electric fields for minimizing flash incidents in Valhal UPS by Søren Hadberg 2014.

8. semester:Lecturer in Non-destructive high voltage test methods in high voltage engineering (2 ECTS), lectures and laboratory work. (16 years experience)  
 Lecturer in High Voltage Technology (lectures + exercises, 2 ECTS)  
 Major work concerning lecture materials (textbook, laboratory instructions, safety procedures, 300 power point slides) to be used in the international masters  
 Elaboration of new high voltage laboratory experiments.  
 Supervisor for guest student 2001  
 - Single phase ground fault protection of 60 kV distribution network.  
 Supervisor for guest students 2003.  
 - Overvoltage protection of 170 kV cables in hybrid cable/OHL networks.  
 - Liberalized electricity market – trading and restrictions – physical and economical factors.  
 Lecturer in electrical conversion technology (electrical machines, power converter drives)  
 Lecturer in Power System Protection (1 ECTS)  
 Lecturer (partly, 6 of 15 lectures) in Advanced power systems (5 ECTS) covering topics of insulation coordination, power system protection, electric field stress and gaseous dielectrics.

9. semester:Lecturer in high voltage design and components (lectures and laboratory work) (1 ECTS)  
 Lecturer in Dielectrics and electrical breakdown (lectures and laboratory work) (1 ECTS)  
 Assistant teacher in EMC design (1 ECTS).  
 Master guest student project: "Line differential protection for 420 kV HVAC transmission 60 km cable line – modeling and simulation" by M. Szykiel, 2009. Prize winning project.  
 Numerous (app. 15-20) projects with students. All are in cooperation with industry.

10. semester:Supervisor at masters thesis projects (one or more) each 2nd semester (selected)  
 - Bottleneck problems at Statnetts transmission grid, J.R. Grønli (2001)  
 - Overvoltage protection of cable networks, H.C. Schimmelmann (2001)  
 - Transmission network enlargement related to the Karahnjúkar project, Iceland,T. Vallson (2002)  
 - Overvoltage protection of large Power transformers by M.Sc. students Kristin E. Einarsdottir, Einar Andresson, Jesper M. Rasmussen, (2003)  
 - Replacement philosophy for 60 kV distance protection relays by M.Sc. student Helgi Petursson, (2003)  
 - Analysis and modeling of switching transients at Eltra's 400 kV hybrid OHL/cable line Ferslev-Trige by M.Sc. Student Kim Søggaard (2005)  
 - Dynamic simulations of switching transients in a compensated 60 kV cable grid by Msc students H.Baldursson og A.Oumarou, (2006).  
 - State estimation methods in the Western Danish transmission network for TSO Energinet.dk by M.Sc. Students Per Balle Holst and Unnur Stella Gudmundsdottir, (2007). Prize winning thesis project by IDA (Danish association of engineers)  
 Optimum Power Flow and reactive power balance in the West-Danish transmission grid, by M.Sc. students Vidir Atlason og Jakob Kessel (2008)  
 - Probabilistic aspects of harmonic emission of large wind farms (DONG Energy), by M.Sc. Christian F. Jensen, 2010.  
 Prize winning project at Energy study board.  
 - Development, validation and application of a vacuum circuit breaker model for time domain analysis in large offshore wind farms by Jakob Glasdam 2011 (EPSR journal paper 2015)  
 - Using PMU measurements to assess dynamic line rating of transmission lines by Sveinn Runar Juliusson 2013.  
 - Condition monitoring of crossbonded transmission cable systems by Morten Thule Hansen and Kasper Schultz Pedersen 2012.  
 - Insulation coordination study of a new 400 kV gas insulated substation by Daniel Olason and Thomas Ebdrup 2012.  
 - Electric field optimization to reduce corona in AAU/ET's 200 kV high voltage laboratory setup by Bjarni Thorsteinsson 2013.  
 - Combined fault of 400 and 150 kV overhead lines by MSc Ragnar Sigurbjörnsson 2015 (paper to DPSP 2016 conference)

PhD: PhD main supervisor for:

Wojciech Wiechowski "Harmonics in transmission power systems" financed by Energinet.dk@, 2002-2005.

Unnur Stella Gudmundsdottir "Comprehensive use of cables in the transmission grid, part A modeling@" financed by Energinet.dk, august 2007-2010.

Filipe Faria da Silva "Comprehensive use of cables in the transmission grid, part B system simulations@", financed by Energinet.dk, 2008-July 2011.

Lukasz Hubert Kocewiak "Harmonics in large offshore wind farms@", industrial PhD project partly funded by Danish Ministry of science and DONG Energy, 2008-2011.

Elif Inan "Voltage dips in the Turkish transmission system, (partly supervised) 2008-2009.

Teruo Ohno "Dynamic Study on the 400 kV 60 km Kyndbyværket-Asnæsværket HVAC cable line, financed by Energinet.dk, 2009-2012.

Christian F. Jensen "Fault localization in HVAC transmission cable networks", financed by Energinet.dk, 2010-2013.

Chengxi Liu "A modern secure power system – use of wide area measurements", financed by DSF, 2010-2013.

Jakob Glasdam "Harmonics in offshore wind power plants employing power electronic devices in the transmission system 2012-2014

Bakhtyar Hoseinzadeh "A Power System Emergency Control Scheme in the Presence of High Wind Power Penetration" 2015

Co-supervisor for 15 PhD's up to present date (2015)

Chairman of the assessment committee at several PhD defenses.

Chairman (moderator) of the session at several PhD defenses.

Industry courses

(ELITE/CPD at AAU):

ELITE course "Distancebeskyttelse af Elforsyningsanlæg@" (distance protection course, 4 full days, lecture and laboratory), May 2002 and November 2002, 2003, 2005, 2007 for external companies, mainly utilities and TSO/DSO.

ELITE kursus "Jordfejlsdetektering i slukkespolejordede 60 kV net@" (Ground fault detection of Petersen coil grounded (compensated) 60 kV networks, 3 full days), Oktober 2006 and November 2008.

ELITE/CPD course "Differentialbeskyttelse af elforsyningsanlæg, teori og tosidet simultan afprøvning med GPS"

(Differential protection, theory and end-to-end testing with GPS, 3 full days), November 2010. Scheduled for spring 2011.

Review: Review of app. 50 papers for IEEE transactions on power delivery, power systems and sustainable energy, mainly within the area of power system protection, system related issues and transient studies. Last Review "Fault Location Using Wide-Area Measurements and Sparse Estimation" in IEEE transactions on power systems 2015. Also IEEE and Cigré conferences are reviewed.

- Elaboration of numerous (app. 80) project proposals for 1-10. semester. Supervision of at least 65 projects in total.

- Major group coordinator (Storgruppekoordinator, 2000-2003) for electrical major group (E-storgruppen) at AAU basic semesters for natural sciences.

- Head of (Fagformand) the electrical basic teaching at the basic semesters (1st and 2nd semester, 2000-2003) at AAU basic semesters for natural sciences.

- Participation in ELITE-supplementary, in-service training course committee.

- Participation in the committee work "Master in sustainable energy engineering@".

- Individual creation and funding of PhD projects with Danish TSO Energinet.dk

- Member of Danish corps of external examiners for electrical engineering (2000-present). External examiner for numerous (app. 60) external project exams.

- Committee member of the working group for new energy engineering education at AAU/dept. of energy technology.

- Head of Energy Technology PhD program with +100 PhD students (from 2012)

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## **2. Studieadministration: Oversigt over studieadministrative opgaver, eksempelvis medlem af studienævn, studieleder, semesterkoordinator, fagkoordinator, akkreditering m.v.**

PhD programleder for Energy Technology

Semesterkoordinator EPSH

## **3. Universitetspædagogiske kvalifikationsforløb: Oversigt over gennemførte universitetspædagogiske kursusforløb, PBL-kurser, workshops, udviklingsprojekter, kollegial supervision o.l.**

Universitetspædagogik for adjunkter.

PhD velderkursus for erfarne PhD vejledere

**4. Anden form for kvalificering: Konferencedeltagelse, debatindlæg, oplæg m.v. i relation til uddannelse, "Undervisningens dag", o.l.**

Skriv dit svar her...

**5. Undervisningsudviklingsforløb og undervisningsmateriale: Oversigt over medvirken til udvikling af nye moduler, undervisningsmateriale, uddannelser, e-learning, samarbejde med eksterne samarbejdspartnere o.l.**

Skriv dit svar her...

**6. Nominering til og/eller modtagelse af undervisningspriser.**

4 gange nomineret til årets underviser.

**7. Evt. personlige refleksioner og initiativer: Personlige overvejelser knyttet til undervisning og vejledning, ønsker til og planer for pædagogisk videreudvikling, planer for opfølgning på undervisningsevalueringer m.v.**

Skriv dit svar her...

**8. Andet.**

Skriv dit svar her...