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.

PhD Supervision. I've been the main supervisor for the following PhD projects:
•2018-2022 Design and Control of a Bearingless Double U-Core Switched Reluctance Machine Used for a Flywheel, Fariba Shakibapour
•2018-2022, Battery State Estimation Methods for Electric Vehicles under Real Temperature Conditions, Alejandro Gismero Galiatsatos
• 2015-2021, A Systematic Approach for Thermal Analysis of Lithium Titanate OxideBatteries, Seyed Saeed Madani
• 2014-2017, Thermal and Reliability Investigation of Buck-Boost Power Converters, BrweneSalah Abdelkarim Gadalla
• 2013-2016, PracticalMethods in Li-ion Batteries for Simplified Modeling, Battery Electric Vehicle Design, Battery Management System Testing and Balancing System Control, Jorge Varela Barreras
• 2013-2016, Power Electronics for Oxide-based High Temperature Thermoelectric Generators, Elena Anamaria Man
• 2012-2016, Magnetic Coupling of Wireless Charging System for Electric Vehicles, Tushar Batra

PhD Courses. I've been involved in the following courses:
• 2025: Batteries: From fundamentals to applications
• 2022 - 2024, Understand how to write good papers for high level journals
• 2021 - 2024, Lithium-Ion Batteries. Systems and Applications
• 2021 - 2024, Lithium-Ion Batteries. Fundamentals, Modelling, and State Estimation
• 2021 - 2024, Low power Energy Harvesting Technologies and Applications
• 2018-2020, Storage Systems Based on Li-Ion Batteries Grid Support and Automotive Applications
• 2014, 2016, Applied Thermoelectrics

External PhD assessment. I've been invited for the following assessments of external PhD theses and candidates:
• **2025**, Aging-Aware Classification and Optimal Usage of Electric Vehicle Batteries, Huang Zhang, Chalmers University of Technology, Sweden
• 2025, Dynamic Battery Usage and its Effect on Degradation, Kristian Bartholdsson Frenander, Chalmers University of Technology, Sweden
• **2024**, Towards Optimal Power Distribution Strategies for Modular Batteries by Xabier Dorronsoro Martinez, University of Mondragon, Spain
• 2024, Condition Monitoring of Lithium-ion Batteries Providing Grid Services by Chunyang Zhao, Technical University of Denmark, Denmark
• **2022**, Characterization methods and modelling for Li-ion batteries by Zeyang Geng, Chalmers University of Technology, Sweden
• **2021**, The Role of Electric Vehicles in the Power System by Andreas Thingvad, Technical University of Denmark, Denmark
• 2021, SOH Estimation of Li-Ion Batteries Based on Broadband Impedance Measurements and Equivalent Circuit Model Analysis by Jusssi Sihvo, Tampere University, Finland
• **2020**, Model-Driven Software Development and Verification Solutions for Safety Critical Battery Management Systems - A Quantitative Evaluation of Probabilistic Inference & Artificial Intelligence Methods by Christian Fleischer, RWTH Aachen University, Germany
• **2013**, Motion Control and Energy Management of Electric Vehicles by Ricardo Jorge Pinto de Castro, University of Porto, Portugal

Teaching. I've been doing teaching in the following courses:
• 2026, Sustainable Energy System Integration, 6th semester. Two lectures.
• 2016-present, 3rd semester, AC Circuit Theory. This is a 5 ECTS point course. I'm responsible for approx. 50 % of the lectures and lab sessions.
• 2021, Aktuering og robotteknik. I gave three lectures on fundamental electric DC and AC ciruits
• 2012-2015, 3rd semester, AC Circuit Theory and Electromagnetic Theory. I'm responsible for the AC Circuit Theory part of the course, i.e. 8 lectures.
• 2011-2014, 1st semester, Introduction to Energy Engineering. Took the half of this 5 ECTS-course.
• 2011, 3rd semester, Grundlæggende AC-kredsløbsteori. Had 4 lectures out of 15.
• 2008-2009, 2nd semester, Fremtidens energisystemer. Had a 2 hour lecture without exercises.

Assistant Teacher. I've been an assistant teacher at the Department of Energy Technology (ET) and Department of Electronics Systems (ES) in the following courses:
• 2010-2011, 6th semester, ET, Scientific Methods", 10 lectures.
• 2010, 3rd semester, ET, Grundlæggende kredsløbsteori, 5 lectures.
• 2010, 3rd semester, ET, Grundlæggende AC kredsløbsteori, approx 3 lectures.
• 2005-2007, 5th semester, ES, Modeldannelse, 10 lectures.

• 2005-2007, 3rd semester, ES, Måleteknik, 5 times, with laboratory exercises.
• 2006, 3rd semester, ES, Grundlæggende elektronik, approx 2 lectures.
• 2006, 3rd semester, ES, Elektromagnetiske kredse, approx 2 lectures.
• 2005, 3rd semester, ES, Elektricitetslære og kredsløbsteori, approx 2 lectures.

Project Supervision. Project work is an important at Aalborg University and I have supervised several groups since I began the PhD study. For almost all the groups I've been the main supervisor, but for a few groups I've been a co-supervisor. At the 1st (until 2010) and 2nd semester the groups also had secondary supervisor supervising the non-technical aspects of the projects. At the higher semesters I've been involved in groups at the Power Electronics and Drives (PED) and Electromechanical System Design (EMSD) specialization and a significant fraction of the students have been international students who followed a master program at the department or who were visiting guests for a semester or two. I've been supervised the following groups/projects:
• **2025**, 10th semester, Application of Pseudo Random Binary Sequences for Battery Impedance Estimation via Motor Drive Systems
• 2025, 9th semester, Online Battery Impedance Spectroscopy Using Pseudo-Random Binary Sequence
• 2025, 9th semester, Project Oriented Study in an External Organisation
• 2025, 7th semester, On Board Charger for Electric Vehicle
• 2025, 5th semester, Pre heating of car batteries
• 2025, 4th semester, Solar Power to Water Electrolyzer Microgrid for Green Hydrogen Production
• 2025, 4th semester, Solar Power-to-Water Electrolyzer for Green Hydrogen Production
• 2025, 4th semester, Dynamometer for Power-Hardware-In-the-Loop testing of Electric vehicles
• 2025, 1st semester, The Advent of the Electric Car and the Future Power Grid
• **2024**, 2nd semester, Bæredygtig transport i byer med upcyclede elcykelbatterier
• 2024, 4th semester, Styring af tørrekammer
• 2024, 4th semester, Design af hastighedsregulator til motortest i dynamometer
• 2024, 8th semester, Battery Impedance Estimation Using Kalman Filters, Recursive Least Squares Method and Field-Oriented Control with a PMSM
• **2023**, 2nd semester, Modelling of an Electric Vehicle - With focus on battery and range estimation
• 2023, 3rd semester, Modellering af EMRAX 228 motor - Til anvendelse af elektrisk formula student bil
• 2023, 4th semester, Dynamometer med hastighedsregulering til motortest
• 2023, 4th semester, Design af Hastighedsregulator til et Elektrisk Køretøj
• 2023, 5th semester, Design of Converter for Mutual Pulse Heating of Lithium-Ion Batteries
• 2023, 9th semester, UAV Drivetrain Assessment and reconfiguration
• 2023, 10th semester, Detailed Simulation and Control of a CLLC converter for MCS application
• **2022**, 2nd semester, Modelling the Energy System of a Fuel Cell Electric Vehicle for Heavy Duty Long Haul Purposes
• 2022, 5th semester, Design of Totem-Pole PFC Converter and Its Control Scheme for a 3.6 kW Welding Machine
• 2022, 2nd semester, Elbil med regenative bremser
• 2022, 4th semester, Design af testbænk til en bilmotor
• **2021**, 2nd semester, Modellering af drivsystem til Small Electric Vehicle
• 2021, 3rd semester, Analysis and modelling of motor and battery in e-scooter
• 2021, 4th semester, Elektrisk Variabel Dynamometer til ECO-Racer ved brug af PMDC-motor
• 2021, 6th semester, EE, Analyses and Control of the Inductive Loop Power Supply
• 2021, 7th semester, PED, DC/DC Converter Control of Reversible Solid-Oxide Cells for Power-to-X Electrolysis
• 2021, 9th semester, PED, Thermal Modelling of Electrical Machines for Line Operation Performance Evaluation in Continuous High Power Bus Applications
• 2021, 9th semester, MCE, Online Battery Impedance Estimation using PRBS on the Motor Controller
• 2021, 9th semester, MCE, Production End Test for Asetek SimSportsSim racing Pedals
• 2021, 10th semester, MCE, Machine Learning-based Online State-of-Health Estimation of Electric Vehicle Batteries
• 2021, 10th semester, MCE, Power Management in Electric Vehicles
• **2020**, 4th semester, Dynamometer design for Hardware-In-the-Loop test
• 2020, 4th semester, Control design for dynamometer for Hardware-In-the-Loop test
• 2020, 5th semester, 3.6 kW bridgeless PFC
• 2020, 9th semester, MCE, Optimal control of the Eco-racer power train
• 2020, 10th semester, MCE, Power control in Fuel Cell Electric Vehicle
• **2019**, 3rd semester, Udvikling af simuleringsværktøj til super elcykel
• 2019, 5th semester, Boost converter for discharging a supercapacitor
• 2019, 5th semester, Bidirectional DC/DC converter for a supercapacitor bus
• 2019, 8th semester, PED, Drive system for an electric go-kart
• **2018**, 1st semester, Elbilens Påvirkning på det Vestdanske Elnet
• 2018, 3rd semester, ZEN Dania: De-sulfatering af bly-syre batterier
• 2018, 5th semester, Universal Actuator Drive for Spacecraft Application
• 2018, 10th semester, PED, Diagnostics of Lithium Batteries
• 2018, 9th semester, EMSD, Solar Battery Storage Design for Ventilaton Purposes
• 2018, 8th semester, PED, Design and Control of a Drive System for a Heavy-Duty Drone
• 2018, 8th semester, PED, Development, Modelling and Implementation of an Electrical Drivetrain for a Go-Kart
• 2018, 7th semester, Grøn Livø - Effekt of load flow analysis af distributionsnettet med vedvarende energikilder implementeret

• **2017**, 7th semester, Wireless Charging of Electric Vehicles
• 2017, 7th semester, Wireless Power Transfer for Electric Vehicles: Experimental Validation of Simulation to Determine a Power Control Strategy
• 2017, 7th semester, Optimering af kontrolprint til varmelegmer
• 2017, 7th semester, 24V-DC/DC Step-down Converter
• 2017, 3rd semester, Analysis and Simulation of an Electric Propulsion System for the Hals-Egense Ferry
• **2016**, 5th semester, Very High Gain DC/DC Converter for Battery Energy Storage Applications
• **2015**, 5th semester, DC-DC converter for PV-Battery System.
• **2014**, 10th semester, PED, MPPT Wind and Photovoltaic using multiple input DC/DC converter.
• 2014, 9th semester, Hardware-in-Loop Emulator for the DFIG Wind Turbine.
• 2014, 6th semester, Operation of PMSG for small grid connected wind turbine systemwith maximum power point tracking.
• 2014, 6th semester, Power supply for wind turbine cooling pumps with low voltage ridethrough capability.
• 2014, 5th semester, Wireless Power Transfer.
• 2014, 4th semester, Designing an Electrical Differential and TCS for Custom Built 2WD RC Vehicle.
• 2014, 2nd semester, Analysis of electrification of Egholm II.
• **2013**, 9th semester, PED, Design and Control of Inductive Coupled Power Transfer System
• 2013, 9th semester, PED, Internship report - Internship at BMW
• 2013, 8th semester, Tvindkraft 1 MW Windmill.
• 2013, 5th semester, Power converter for thermoelectric generators.
• **2012**, 9th semester, Wireless Charging for Hybrid Electrical Vehicles.
• 2012, 6th semester, Wireless Charging of Electric Vehicles.
• 2012, 6th semester, The Doubly Fed Induction Machine.
• 2012, 5th semester, Wireless Charging of Electric Vehicles.
• 2012, 4th semester, Design of Cruise Control for Mini-el.
• 2012, 1st semester, SunDrive.
• **2011**, 9th semester, PED, Multiple-Input Converter for Battery/ultracapacitor Application.
• 2011, 6th semester, ET, DC/DC Converter for TEG Modules.
• 2011, 4th semester, ET, Control the Speed – Analysing, designing, implementation and testing a cruise control for the Mini-el.
• 2011, 3rd semester, ET, Hybrid ellert.
• 2011, 2nd semester, ET, Soldrevet elbil.
• 2011, 1st semester, Bølgeenergi – Udglatning af peak-effekt
• 2011, 1st semester, Trådløs opladning af elbiler.
• **2010**, 6th semester, ET, Reactive Power Control with SVC.
• 2010, 6th semester, ET, TEG DC/DC Converter.
• 2010, 5th semester, ET, Synchronous Compensator: Transmission and Conversion of Energy in Electrical Machines and Power Systems.
• 2010, 4th semester, ET, Design of Bi-directional DC Motor Controller and Cruise Control.
• 2010, 3rd semester, ET, Vejen til en fossilfri transportsektor: Opbygning og modellering af hybridsystem i Mini-El.
• 2010, 1st semester, ET, Elbiler.
• 2010, 1st semester, ET, Wave Energy Systems.
• 2010, 1st semester, ET, Vindenergi I det private marked.
• 2010, 8th semester, EMSD, AC Motor Control System for Electric Go-cart.
• **2009**, 10th semester, PED, Switching Frequency Reduction Using Sensorless Model Predictive Direct Control for High Power VS.
• 2009, 10th semester, PED, Multiple-input converter for a battery-ultracapacitor hybrid electric vehicle.
• 2009, 8th semester, EMSD, Design of SPMSM drive System for Renault Kangoo.
• 2009, 5th semester, ET, DC generator for renewable energy sources.
• 2009, 4th semester, ET, Automobil permanent magnet generator med buck/boost konverter.
• 2009, 3rd semester, ET, Design og modellering af benzin-elektrisk hybridsystem til implementering i Mini-El
• **2008**, 9th semester, PED, Design of Inverter-Fed SPMSM-Motor Drive Line in a FC Truck System.
• **2007**, 8th semester, PED, Design of an Inverter-Fed PMSM-Motor Drive Line.
• 2007, 8th semester, EMSD, Dynamic Control of an Electric Truck Motor.• 2007, 5th semester, ES, Elektrisk Go-Kart med elektronisk differentiale.
• 2007, 2nd semester, ES, Antilkollisionsradar til legetøjsbil.
• **2006**, 5th semester, ES, Avanceret krøjesystem til vindmøller.
• 2006, 4th semester, ES, Styring med seriel bussystem.
• **2005**, 5th semester, ES, Avanceret krøjesystem til vindmøller og fluktuering.

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.

Coordinator. I've been the coordinator for the following semesters:
• 2012-present, 4th semester, Semester Coordinator
• 2012-present, 6th-7th semester, Internship Coordinator
• 2011-present, 5th semester, Semester Coordinator

• 2011-2021, 6th semester, Semester Coordinator

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

• 2010-2012, I took the 'University Pedagogy' course for Assistant Professors at Aalborg University

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

•2022, I participated in the ShareENG conference at Aalborg University, where i presented my work on the Micorcredential course 'Lithium-Ion Battery Modelling'
• 2018, I participated in the 'University Teaching Day' at Aalborg University where I joined the 'Research Based Teaching' workshop.

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.

Study Programmes: I had an active role in defining the new 'Curriculum for the Bachelor of Science Programme in Energy starting' from 2015.
Teaching materials: For all the courses I've been involved in, I've made comprehensive power point presentations. For the Microcredential course on Lithium-Ion Battery Modelling, I wrote a note for the students.
Laboratory exercises: For the 'AC Circuit Theory' Course, I've been developed several laboratory exercises in order to provide a better understanding for the students. Example of topics: Phasors, impedance, mutual inductance, power factor.

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

I was nominated for 'Teacher of the Year 2016'.

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.

One of the most important parameters related to learning is motivation. Therefore, I try to explain why the topics of each lectures are relevant. When it comes to projects, I propose projects which are relevant for the actual society we live in and which involves industrial cooperation, if possible.
It is also important, that the students get hands-on experience on the different topics. This is natural embedded in the project work, but for courses I think it's important that the students also will do laboratory work together with assignment.

8. Any other information or comments.

Type your answer here...