

## Undervisningsportfolio

**1. Undervisnings-CV: Oversigt over undervisnings- og vejledningsopgaver med angivelse af fagområder, omfang, undervisningsniveau (bachelor, kandidat, efter-/videreuddannelse, ph.d.). Type af undervisningsform angives, f.eks. forelæsning, holdundervisning, øvelse, vejledning, eksamination, censur, fjernundervisning, internetbaseret undervisning og evaluering af undervisning. Undervisningssprog angives.**

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Courses/Lectures (BSc+MSc level)

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2023 – EE5/MCE5 – “Power Electronics” – 5 ECTS, 3 lectures + exercises, examination  
2022 – EE5/MCE5 – “Power Electronics” – 5 ECTS, 3 lectures + exercises, examination  
2021 – EE5/MCE5 – “Power Electronics” – 5 ECTS, 3 lectures + exercises, examination  
2020 – EE5/MCE5 – “Power Electronics” – 5 ECTS, 3 lectures + exercises, examination  
2017 – EE5/MCE5 – “Power Electronics” – 5 ECTS, Teaching assistant for 6 lectures + exercises

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Courses/Lectures (PhD level)

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2019 – PhD – “Power module design, packaging and testing”, 1.5 hour lecture – “INTEGRATED POWER MODULE PACKAGING”  
2018 – PhD – “Multiphysics Simulation and Design of Power Electronics”, 1.5 hour lecture – “ANSYS Q3D EXTRACTOR WORKSHOP”

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Supervision (BSc+MSc level)

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2022 – Co-supervisor- PED3-924 - "Modify Modular Multilevel Converter Cells towards an DC Circuit Breaker", Jakob Jacobsen  
2022 – Main supervisor - EN1-108 - "V2H For En Almindelig Husstand", Nikolaj Kjægaard Andersen, Andreas Bundgaard Husted, Niels Kjægaard, Rasmus Dam Nielsen  
2022 – Main supervisor - EE6-612 - "GaN DC-DC buck-boost on-board converter for EV", Jeppe Vilsøe Jensen, Nikolaj Kristensen, Jakob Deichgraeber, Kerim Brackovic  
2022 – Co-supervisor - PED4-1040 - "Design and experimental implementation of 3.6 KW bridgeless Totem-pole PFC converter for welding machines", Gansheng Huang  
2021 – Co-supervisor - PED3-941 - "3.6 kW bridgeless PFC", Frederik Brath Severinsen, Gansheng Huang  
2021 – Main supervisor - EN1-B143 - "Pumped Storage Hydropower i Danmark", Mads Nedergaard Andersen, Tobias Dahl Steensen, Rasmus Terp Jensen, Marie-Louise Eske Jensen  
2021 – Main supervisor - EN1-B142 - "Ellagring i et fremtidigt dansk elnet", Nicolai Guldager, Lucas Haals Burchardt, Tobias Arnfeld Sparre, Rasmus Rose-Hansen, Frida Lyngholm Andersen  
2021 – Co-supervisor - PED4-1041 - "Control of Converter Switching Waveforms", Pawel Piotr Kubulus  
2021 – Co-supervisor - PED4-1048 - "Class-E Push-Pull Resonance Converter", Janus Dybdahl Meinert, Benjamin Futtrup Kjærsgaard  
2021 – Co-supervisor - PED4-1046 - "Design and Optimisation of a Half-Bridge Switching Module With Parallel GaN HEMTs for High Power Applications Using Finite-Element Analysis", Mike Robin Zäch, Sigmundur Í Garði, Simon Holt Olsen  
2020 – Co-supervisor - PED3-943 - "Digital Design and Optimisation of a Bridgeless Totem-Pole PFC Converter Using Finite-Element Analysis", Mike Robin Zäch, Sigmundur Í Garði, Simon Holt Olsen  
2020 – Co-supervisor – PED4-1045 – “Analysis and Design of a Novel Multicell approach to DC/AC Inverter”, Faheem Ahmad

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Supervision (PhD level)

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Co-supervisor Mike Robin Zäch “Power Density Optimization of High Efficiency Wide-Band Gap Semiconductor Power Modules using Digital Design” (2022-2025)  
Co-supervisor Masaki Takahashi “Developing Reliability Design Method with 3D-simulation of SiC MOSFET Power Module” (2021-2024)  
Co-supervisor Zhongchao Sun “Digital design-based and data-driven combined power electronics packaging reliability analysis method” (2021-2024)  
Co-supervisor Pawel Kubulus “Digital Twin Based Automated Design for Converters Incorporating Wide-Band Gap Devices” (2021-2024)  
Co-supervisor Janus Meinert “Conducted and radiated noise emissions in fast-switching WBG systems” (2021-2024)  
Co-supervisor Rui Wang “Series-connection of SiC MOSFET devices using a single self-driven gate driver” (2020-2023)  
Co-supervisor Faheem Ahmad “Transistorization of Industrial Dielectric Heating Plants” (2020-2023)  
Co-supervisor Hongbo Zhao “Modeling and Reducing the Parasitic Capacitance in Medium-Voltage Inductors” (2018-2021)

**2. Administration og ledelse af uddannelse: Erfaring med uddannelsesledelse og –koordinering. Oversigt over studieadministrative opgaver, eksempelvis medlem af studienævn, studieleder, semesterkoordinator, fagkoordinator, akkreditering m.v. Erfaringer med planlægning af uddannelsesafvikling. Erfaring med udvikling af uddannelser. Deltagelse i udvalg, kommissioner m.m. vedr. uddannelse.**

2023 – Course-coordinator - EE5/MCE5 – “Power Electronics” – 5 ECTS

2022 – Course-coordinator - EE5/MCE5 – “Power Electronics” – 5 ECTS

2021 – Course-coordinator - EE5/MCE5 – “Power Electronics” – 5 ECTS

**3. Formel pædagogisk uddannelse: Oversigt over gennemførte universitetspædagogiske kursusforløb, PBL-kurser, workshops, udviklingsprojekter, kollegial supervision o.l. Udtalelse fra universitetspædagogikum. Deltagelse i konferencer om pædagogik og didaktik. Dokumentation i form af kursusbeviser, udtalelser m.m. vedlægges.**

2022 University pedagogical programme at Aalborg University

Supervisors: Henrik Clemmensen Pedersen, Aida Olivia Pereira de Carvalho Guerra

Report “The dynamic role as supervisor at a problem based learning university” – 10 pages

Courses (Compulsory/Mandatory)

18-01-2022: Module 1: Teaching at a PBL university (1 of 2)

10-02-2022: Module 1: Teaching at a PBL university (2 of 2)

03-03-2022: Module 2: Planning and Implementation of Group Instruction (1 of 2)

25-03-2022: Module 2: Planning and Implementation of Group Instruction (2 of 2)

28-03-2022: Module 3: The Use of IT and Media for Learning and Teaching (1 of 2)

20-06-2022: Module 3: The Use of IT and Media for Learning and Teaching (2 of 2)

30-03-2022: Module 4: PBL Group (1 of 2)

26-04-2022: Module 4: PBL Group (2 of 2)

10-05-2022: Module 5: Planning, Development and Quality assurance (1 of 1)

Courses (Electives)

12-10-2022 Research integration

13-10-2022 Group examination – Understanding the complex role of the examiner

10-11-2022 PBL in Engineering and Science

30-11-2022 Facilitating student activity

From the evaluation report of 2022 University pedagogy course at Aalborg University, supervisors Henrik Clemmensen Pedersen and Aida Olivia Pereira de Carvalho Guerra have given the following statement as evaluation of my teaching and supervision:

According to the University Pedagogy framework of provisions, Asger fulfilled the objectives set for the project report. He identified and addressed a self-chosen challenge. His challenge was addressed through the following questions: (i) Do problems that students face during their studies change over time, and how does it impact the supervision that they should be provided? (ii) What are some approaches and methods that the supervisor can use, to better comprehend the dynamics of supervision during the time from first to tenth semester?

Asger reflected on his supervision style by relating his reflections with style descriptions provided by literature. This was followed by students' feedback on how they experienced Asger's supervision, providing Asger additional inputs for reflection and adjustment of his practice. From a developmental perspective, the approach documented in this report can be used by him in future supervision sessions enabling him to better adjust to students' needs and contribute to better learning experiences and outputs. In the future, Asger could also consider taking this exercise as part of the first supervision meeting as well, especially in higher semesters, where students have previous experiences. This would enable, for example, to align expectations between students and supervisor as well as to provide input to the supervisor about the type of group and students he has in front of him, thus enabling a more adjusted supervision for a given group.

Summary statement  
Based on the observations and supervisor meetings, it is clear that Asger is a very well-prepared and enthusiastic teacher who pays attention to the students and the learning environment. Furthermore, he firmly holds the ability to teach fundamental engineering disciplines in a PBL context with a good reflection of his own practice and in which directions to move for further improvement and development.

Given the above, we consider that Asger fulfills all the requirements and successfully passes the university pedagogy course for assistant professors.

**4. Andre kvalifikationer: Bidrag til konferencer, debatindlæg, videnskabelige artikler om pædagogiske emner m.v. Kollegiasupervision, redaktørarbejde, erfaring som mentor og anden kompetenceudvikling.**

Skriv dit svar her...

## **5. Pædagogisk udvikling og forskning: Udvikling af nye kurser, undervisningsmateriale, undervisnings- og eksamensformer eller andet udviklingsarbejde. Didaktisk og pædagogisk forskning. Samarbejde med eksterne samarbejdspartnere.**

Electrical engineering students are introduced to the topics of power electronics and switch mode power supplies through the derivation of the simple second order DC-DC converter topologies such as the buck, boost and buck-boost. The operation of such converters is described in detail and the governing equations are derived step by step in various text books and freely available online sources. However, there is a steep learning curve in open access knowledge when it comes to expanding this knowledge further to fourth order DC-DC converter types such as the Cuk, Zeta and Single-Ended Primary-Inductor Converter (SEPIC) topologies.

The purpose of publishing the following open access papers is to guide engineering students and ease their transition from the most basic DC-DC converter topologies to more advanced types:

A. B. Jørgensen "Derivation, Design and Simulation of the Single-Ended Primary-Inductor Converter (SEPIC)", 2019, engrXiv URL: <https://engrxiv.org/preprint/view/494/>

A. B. Jørgensen "Derivation, Design and Simulation of the Zeta converter", 2021, TechXiv URL: [https://www.techrxiv.org/articles/preprint/Derivation\\_Design\\_and\\_Simulation\\_of\\_the\\_Zeta\\_converter/16732825](https://www.techrxiv.org/articles/preprint/Derivation_Design_and_Simulation_of_the_Zeta_converter/16732825)

I also frequently use the papers as self-study for students in semester projects, for them to work through the analysis in their own pace step-by-step.

## **6. Udtalelser om undervisningskompetencer fra foresatte og kolleger. Undervisningsevalueringer og eventuelle udmærkelser for undervisningsvaretagelse.**

**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. Refleksioner over eget pædagogiske arbejde, dets målsætninger, metoder og gennemførelse. I refleksionen analyseres og motiveres dine pædagogiske aktiviteter i forhold til din pædagogiske forståelse og de studerendes læring. Tanker om undervisningsformen på Aalborg Universitet, der har et stort indhold af gruppeorganiseret projektarbejde og problembaseret læring (PBL).**

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## **8. Andet.**

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