

## Teaching portfolio

**1. Teaching CV: A list of teaching and supervision tasks, including specification of academic fields, scope, level (bachelor, master, continuing education, PhD). Please state the teaching method used (e.g. lecture, class teaching, exercises, supervision, examination, coexamination, distance teaching, internet-based teaching and evaluation of teaching). Please also indicate the language of instruction.**

COURSES TAUGHT COURSE 1: Matrix Computations and Convex Optimization (5ECTS), (Teaching Assistant) I was teaching assistant for this course for 4th semester Electronics and data engineering students, in the spring of 2014.

COURSE 2: Modelling and Simulation (5ECTS) <https://moduler.aau.dk/course/2020-2021/N-ED-B4-2> I have taught this course four times so far, three times to 4th semester BSc in Electronics and Data students in [Spring 2018, Spring 2019, Spring 2020] and once to 4rd semester BSc, Applied Industrial Electronics in spring 2020. In this course, I cover the following subjects: -Control oriented modeling of physical systems, such as mechatronic systems, flow dynamic systems, energy production/transportation/distribution systems, process systems. -Laplace transform and transfer functions -State space models -Linearization techniques -Experimental modelling of linear and non-linear dynamic systems, including experiment design, data collection and pre-filtering, model structure selection, parameter estimation and model validation - Introduction to numerical computing and mathematical model simulations using MATLAB, Simulink and python

COURSE 3: Signal Processing (5ECTS) <https://moduler.aau.dk/course/2020-2021/n-aie-b3-2a> I have taught this course four times so far, two times to 5th semester BSc, Electronics and Data in [Fall 2018, Fall 2019] and two times to 3th semester BSc, Applied Industrial Electronics in [Fall 2019, Fall 2020]. In this course, I cover the following subjects: -Discrete-time signals and systems -Z-transform -Fourier Series, frequency analysis and discrete Fourier transform -Sampling of continuous-time signals and its frequency analysis -Filter Design and analysis -Implementation of IIR filters using bilinear transforms and impulse invariant methods -Implementation structures of discrete time systems and Implementation of Digital filters onto hardware -Measurements, instrumentation principles and sensors

COURSE 4: Condition Monitoring and Product Life-Cycle Management (2.5 ECTS) <https://moduler.aau.dk/course/2019-2020/N-APEL-K1-3?lang=en-GB> I have taught this course one time so far to 1th semester MSc students on Advanced Power Electronics [F2020]. In this course I cover the following subjects: -Predictive and preventive maintenance techniques -Condition monitoring techniques -Principles of different measurement sensors and technologies for condition monitoring -Vibration based condition monitoring -Signal processing -Introduction to reliability theory

COURSE 5: Modelling and control of Robot Manipulator <https://moduler.aau.dk/course/2020-2021/n-aie-b6-3a> This is a new course, which will be offered for the first time in the spring of 2021. I am responsible for developing the course material and the practical sessions and I will be teaching this course to 6th semester BSc students on Applied Industrial Electronics in the fall of 2021. The main themes of the course are the following: -Introduction to robotic systems and manipulators (Hardware design and sensing) -Direct and Inverse Kinematics -Dynamics (Euler-Lagrange, Newton-Euler, Lagrange d'Alembert) -Path generation, following and visual servoing -SISO control and advanced MIMO Control -Feed-forward and feedback control -Introduction to fault detection - Interfacing with Robotic manipulators (case study with a Kinova Gen 3 Lite, using the Kortex API for python (for high level control [position]) and C++ (for low level control [torque])

SUPERVISION OF BSC AND MSC STUDENTS So far, I have accumulated 2200 hours of supervision involving more than 60 student groups, where the students have been from the range of 3rd semester BSc to 10th semester MSc. I supervise the students in many different topics: -Modeling of physical systems -Classical and advanced Control -Signal Processing -Robotics (UAVs, wheeled ground robots and floating vehicles) -Sensor technologies, interfacing and communication protocols. -Offshore Separation process -Optimization of Wastewater treatment process -Reliability -Disturbance rejection -Implementation using different platforms (ARM, MCU, Linux) and languages (C, C++, Python, Matlab, Simulink Real Time, ROS)

PHD SUPERVISION I am a co-supervisor for three PhD students, the details are listed below: Thesis title: MPC: Model prediction control for slug flow suppression and water treatment in daily operation of oil field facilities (study period 2020 to 2023) I am a co-supervisor to the PhD student Stefan Jespersen from AAU-E. The topics that I will be helping with are advanced control of separating facilities, plant wide control, oil in water measurement technologies and implementation onto real time systems. Thesis title: Deep Learning in robotics and big data for applications in wind-turbine inspections (study period 2020 to 2023) I am a co-supervisor to the PhD student Zakariae Machkour from AAU-E. The topics covered by my supervision are deep learning, advanced control, use of Deep Neural Networks (DNN) for control and signal processing. Thesis title: Autonomous Grasping of Overhanging Power Cable by a UAV (study period 2020 to 2024) I am a co-supervisor to the PhD student Frederik Falk Nyboe from University of Southern Denmark (SDU) Unmanned Aerial Systems (UAS) Centre. The PhD study is part of the Drones4Safety research project. The topics covered by my supervision are low- and high-level control, disturbance rejection, system modelling, visual servoing, and path planning.

**2. Study/programme administration and management: Experience in programme management and coordination. A list of study administration tasks, e.g. study board membership, chair of study board, semester or course coordinator, accreditation tasks, etc. Experience in planning teaching activities. Experience in programme development. Participating in committees and commissions etc. on education issues.**

Type SEMESTER COORDINATION In total I have performed 265 semester coordinator hours. This has been in the coordination of 1st, 2nd and 4th semester MSc students on the study program - Intelligent reliable system, and 1st semester MSc students on the study program - Offshore Energy Systems. In total this equates to 10 different semester coordination tasks. Semester coordination involves coordinating the activities of a semester. This includes helping students form groups and select relevant projects, chairing the semester startup meeting and three status meetings and solve administrative issues if they arise. your answer here...

**3. Formal pedagogical training: A list of completed courses in university pedagogy, PBL courses, workshops, academic development projects, collegial guidance and supervision, etc. Written assessment from the course in university pedagogy for assistant professors. Participation in conferences on pedagogy and didactics. Please enclose any documentation of the above, such as course certificates, references, etc**

Diploma in University Pedagogy for Assistant Professors at Aalborg University, in the period November 2017— December 2018 . 10 ECTS Course given by AAU Learning Lab, Aalborg University.

**4. Other qualifications: Conference contributions and attendance, contributions to debates, scientific articles on pedagogical issues etc. Peer supervision, editorials, mentoring experience or other types of competence development activities.**

Skriv dit svar her...

**5. Pedagogical development and research: Development of new courses, teaching materials, teaching methods, examination types or other types of pedagogical development. Didactic and pedagogical research. Cooperation with external collaboration partners.**

STUDY PROGRAMME FORMULATION I have been extensively involved in the design and conceptualization of a new study program at AAU "Renewable Energy and Electronics Engineering", with the Danish title "Vedvarende energi og elektronik". In this effort my task has been the following: brainstorming for contents, multiple meetings and workshops on shaping the contents and authoring several course curricula.

**6. References on your teaching skills from superiors or colleagues. Teaching evaluations and any teaching awards received.**

Type your answer here...

**7. Personal reflections and initiatives: Here you may state any personal deliberations as regards teaching and supervision, any wishes and plans for further pedagogical development, plans for following up on student feedback/evaluations, etc. Personal reflections on your own pedagogical practice, including objectives, methods and implementation. This should include an analysis and a reasoned description of your pedagogical activities in relation to your pedagogical understanding and student learning. Thoughts on the teaching method at Aalborg University (which is largely based on group-organised project work and problem-based learning)**

Type your answer here...

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

Type your answer here...