

Title: Modern Electrical Drives / Moderne elektriske drivsystemer
ECTS credits: 5
Prerequisites: 2 nd semester on the MSc in Energy Engineering or similar
Relevant for: PED, WPS, EPSH, MCE
Objective: Students who complete the module should have the following knowledge, skills and competence: <p>Knowledge</p> <ul style="list-style-type: none"> • Have solid knowledge about the working principle of various types of electrical machines. This will give a firm base for understanding of new types of machines invented in recent years, e.g. the modern drive unit in electric vehicles or wind turbines • instead of using complicated mathematic equations, a new approach, based on a professional machine design environment, will be used to give an easy but deep access to many difficult topics involved in electrical machines • Understanding high performance control technologies for electrical machines. The main focus will be laid on sensorless control of permanent magnet type electrical machines • Gain practical knowledge about implementing of various sensorless control algorithms for permanent magnet machines. Dspace system will be provided to facilitate the lab work, which will occupy a considerably high percentage of this course module • Gain good experience about design of various controllers to meet different requirements, e.g. very low speed stable operation, low-cost controller design, stability analysis of the machine control system, etc. <p>Skills</p> <ul style="list-style-type: none"> • Be able to evaluate different types of electrical machines in a professional way. Be able to understand and analyse new types of electrical machines that may occur in the future • Be able to build a good machine controller to meet different requirements and for various applications • Practical experience gained from this course will let you be aware of important practical implementation issues when designing the controller • Be able to test, measure and characterize the performance of different electrical drive systems. <p>Competence</p> <ul style="list-style-type: none"> • Independently be able to contribute to a professional team dealing with design of modern electrical drives, including new high performance electrical machines and advanced control technologies.
Type of instruction: The course is taught by a mixture of lectures, workshops, exercises, mini-projects and self-studies
Examination format: Individual oral examination which will be held in accordance with the rules in the Examination Policies and Procedures, Addendum to the Framework Provision at Faculty of Engineering and Science, Aalborg University
Evaluation criteria: As stated in the Framework Provisions