

# EJ2201

## Electrical Machines and Drives

6 ECTS, P1-2 2015

After this lecture you should be able to:

- Know where to find information
- Check scheduled course activities
- Organize your studying time for the course



# Outline

- Course goals
  - Examination
  - Course activities and teaching team
  - Course administration (KTH Social / My Pages)
    - Course registration
    - Short tests 1&2 and exam registration
  - Course webpage Bilda
    - Lab registration
    - Project registration
  - Communication
  - Studying tips
- 



# Have you read the course description (PM) already in KTH Social?

1. YES
2. NO
3. I am not sure

**READ COURSE DESCRIPTION**



# Course objectives

After the course, participants are expected to be able to:

- Describe the fundamental parts of electrical drives including converter, electrical machine and load.
- Explain the operating principles of **induction machines**, **synchronous machines** and **dc machines**
- Identify parameters in models of electrical machines
- Use **equivalent circuits** to analyze electrical machines in **steady state**
- Construct phasor diagrams for different loads and use the **vector method for analysis of AC machines**
- Describe the design of a simple **three-phase ac winding** and explain the concepts of pole number and winding factor
- Explain the background to **voltage harmonics** and estimate their influence on e.g. losses in electrical machines
- Use dynamic simulation software to analyze **vector control** of induction motors.



# How much do you guess is new for you?

1. 0-10%
2. 10-40%
3. 50-80%
4. More than 80%



# Examination

In order to pass the course, the following items have to be completed:

- LAB1 (0.5 credits): Two laboratory exercises (P/ F)
- PRO1 (1.5 credits): Project work (P/ F)
- TEN1 (4 credits): Written examination (A-E)

The grading of the course (A/F) is given by the grading at the written examination (TEN1).

Check old exams in Bilda!!!

P/F = pass/fail



# Have you done labs with 400V voltages before?

1. Yes
2. No
3. Hardly any



# Scheduled course activities and teaching team

- 14 lectures of 2 hours
  - Juliette (13)
  - Lennart Harnefors, (1) vector control of IM
- 8 tutorials of 2 hours  
Naveed/Tim and Rúdi



- 2 labs of 4 hours  
Mojgan and Tim



**And YOU!!! (see studying tips)**





# Course administration

- My Pages/ Programme
  - Registration course **DO IT A.S.A.P!!**
  - Registration short tests and exams
- My Pages/ Courses (demo)
  - Course description/PM (latest version)
  - Schedule + homework
  - News
  - Lab preparation submission



# Course webpage Bilda

- Information soon posted in Bilda
  - Lab registrations (2)
  - Project registration and report deliveries
- Course documents in Bilda
  - left menu for information
  - /documents for download

demo



# Communication

- Teachers are keen on helping you so ask for help, no questions are stupid!
- Open door policy, call in at corridor door Teknikringen 33
- Emails to book time (reduced possibilities at course activities)
- Check and report course clashes A.S.A.P.

OBS: I will not be at KTH on Wednesdays during Sept-Oct. Little boy waiting for me at home!



# What is your preferred way of studying?

1. You read course books
2. You listen to teacher
3. You listen/read and write down own notes
4. You solve problems on your own
5. You solve problems with friends
6. Other



# Studying tips

- 6 ECTS = ca 150 hours under 15 weeks
- **Work regularly** from beginning means ca 10 hours per week
- **Work efficiently:** go for active learning

Table 5.1: Most people learn ...

“[...] to learn, students must do more than just listen.” Wikipedia “active learning”

10%	of what they read
20%	of what they hear
30%	of what they see
50%	of what they see and hear
70%	of what they talk over with others
80%	of what they use and do in real life
95%	of what they teach someone else



Source: Attributed to William Glasser; quoted by *Association for Supervision and Curriculum Development Guide 1988.*

# Written examination = problem-solving

- Training doing similar activity as examination:  
*solve problems with friends outside scheduled course activities, attend tutorials and be active*

- You cannot cope with variations if you do not understand deeply the underlying concepts  
*read books, watch videos and attend "lectures"/do quizzes*

***BE ACTIVE:*** *Take notes, take pauses every 10min or so and explain to (imaginary) friend what you have just understood with your own words*



# Come prepared to activities in class

- check homework in EJ2201 schedule

- You read book(s) and/or watch videos from TU Delft
- During the lecture, we deal with difficult parts of reading (you can send queries to teacher) and we deal with questions at concept level, helping each other whenever needed.

*You have already tested being activated today thanks to clickers.*



**If you have one clicker from EJ2301 Power Electronics, take it with you !**



# Homework

## Register in the course + read course PM

Thu 3 sep 13:00-15:00

LESSON

Teachers: Juliette Soulard

Location Q2

### Lecture 2

Operating principle of DC machines, equivalent circuit (comp. chpt 8-8-4)

*homework before:*

1- Control your pre-requisites by reading handouts Magnetic Circuits and Electromechanical Energy Conversion from [SEN].

2- Go to [Chalmers visualisation program](#) , choose electrical machines and go through "magnetic" and "DC current".

4- Study pages 237-251 (pp1-15 in pdf file of chapter 5) in [LED]  
.Read beginning of chapter 8 in EJ2200 book, including section 8.4.

Alt. 4- corresponding contents in [SEN] (chapter 4 pp121-166) and/or [FIT] (chapter 7).

References details are given

at <https://www.kth.se/social/course/EJ2201/page/other-sources/>





# What is the current in the capacitor

1. DC (constant value) equal to 4A
2. Sinusoidal with RMS value of 8 A
3. Sinusoidal with RMS value of 4A
4. None of the above

