

Sensoren T-Shore Sensors

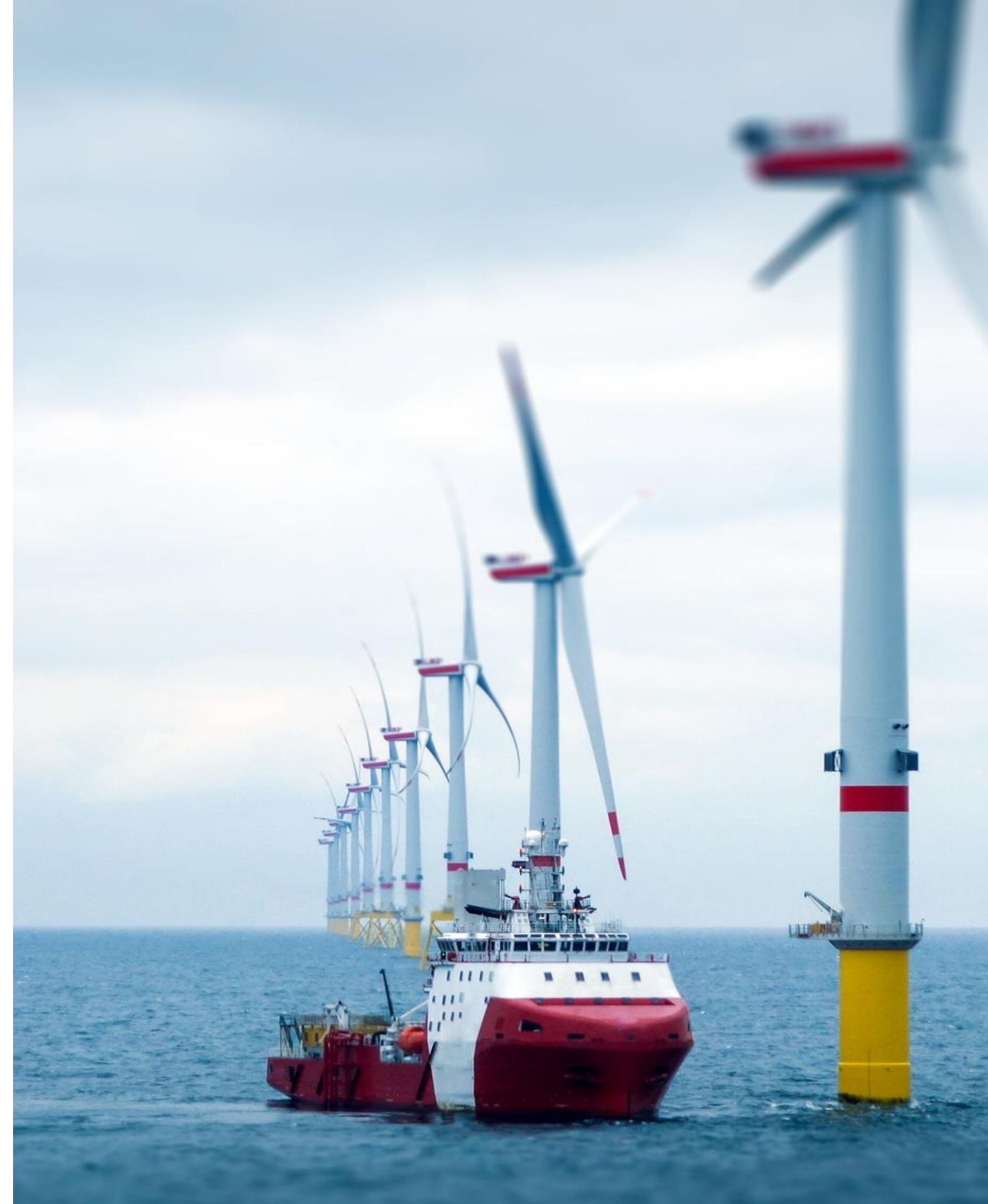
Elective course 'Maintenance of wind turbines' K1312

3 lessons of 4 hours on sensors

Lesson 1: Acquire general knowledge about the function and operation of sensors

Lesson 2: Acquiring skills and learning in practice

Lesson 3: Carry out an integral assignment



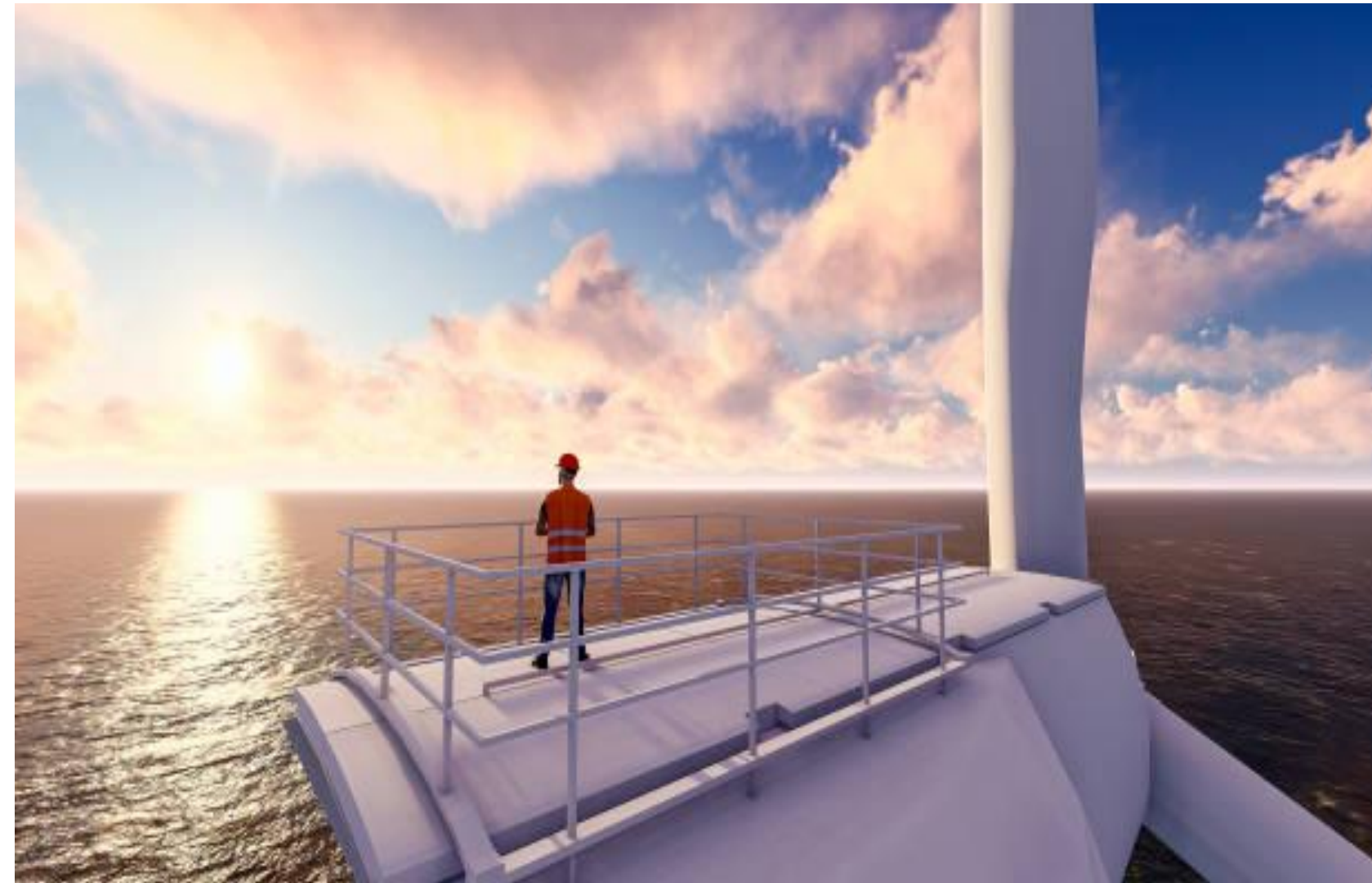
Agenda Lesson 3

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| 1. Agenda and lesson goal | 5 min |
| 2. Retrieve prior knowledge mentimeter.com | 10 min |
| | |
| 1. Plenary instruction assignment | 15 min |
| 2. Transfer to simulator | 10 min |
| | |
| 1. Instruction assignment on the spot | 10 min |
| 2. Drawing up a plan of action | 20 min |
| 3. Performing the practical part (2x 40 min) | 80 min |
| 4. Fill in checklists | 15 min |
| | |
| 5. Plenary reflection assignment | 30 min |
| 6. Test yourself with Kahoot | 15 min |
| 7. Completion and preview | 15 min |



Lesson objective

1. After the lesson you will know whether you can properly perform/complete the exam part about sensors
2. After this lesson, you can fix a malfunction of a sensor by going through all the steps required from A to Z



Retrieve prior knowledge (10 min)

Possible questions (mentimeter.com):

- Which sensors are in the wind turbine?
- Where are the sensors located?
- What could be wrong or broken?
- What steps do you take in the event of a malfunction?
- What is important in the context of safety?



Introduction 1/2

Lesson 3 is entirely devoted to an integral exercise in which a team (3 mechanics) diagnose and repair a signaled malfunction.

This assignment is also a test case of whether you, as an aspiring wind turbine mechanic, are considered competent as a starting professional.



Introduction 2/2

- Each team consists of 3 people (aspiring wind turbine mechanics)
- Each mechanic has specific talents and areas of interest, but often also has a different background with regard to knowledge and skills.

Think of;

- Specific electronics knowledge
- Mechanical technical knowledge
- ICT knowledge
- Construction/Infrastructure technology



Case

The team receives a message from the central plant (PD4) that there is a malfunction in wind turbine A7.

The SCADA system displays an error message. There was a heavy storm last night and wind turbine A7 has stopped and does not start up automatically.



Assignment 1/2

Procedure

Each team (3 people) conducts a separate investigation.

This can be;

- a fault with the wind sensor
- temperatuursensor
- trilling sensor
- speed sensor

Because there is only one Nacelle and one Festo simulator, we work in a rotating system.

In principle, each group has a maximum of 40 minutes to analyse the malfunction in the Nacelle or the Festo. This means that the preparatory work must be well coordinated.



Assignment 2/2

- a. The problem is made clear to the entire group in advance. (a malfunction of a sensor in the Festo and a malfunction in the Nacelle) (time about 10 min.)
- b. The team is divided into groups of 3 people with different expertise (mechanical, electronic, ICT, general).
- c. Each group starts by working out a step-by-step plan, how are we going to approach it. (approx. 20 min)
- d. After that, two groups go to the Nacelle and two groups go to the Festo.
- e. Each team is given 40 min to diagnose, analyze, report and repair the malfunction in practice
- f. Each team has 20 minutes to describe what they have done and to fill in the corresponding checklist.



Guidelines 1/2

Investigate what may be the cause here

1. What equipment do I need ?
2. Describe all steps in turn
3. Perform the required actions
4. Divide the tasks within the team in such a way that all talents are used to the maximum. Apply the principle of Master-Apprentice in which everyone uses their specific expertise in their own field of expertise and helps the colleague in the learning process to acquire that expertise as well.

It is teamwork and is about learning from and with each other!



Guidelines 2/2

5. Observe all safety regulations
6. Report where the malfunction is to the PD4/Central plant
7. If necessary, repair the malfunction
8. Describe in a checklist all actions of;
 - Safety
 - Malfunction
 - Diagnosis
 - Analysis
 - Reporting to PD4
 - Repair



Reflection assignment

At the end of this exercise, the different teams present to each other in plenary:

- how the assignment went
- what people have learned from each other
- which matters are still insufficiently clear.

Time approx. 60 min



Test yourself Kahoot

Link to questionnaire



Conclusion and evaluation (30 min)

- **How did the exercises go?**
- **Short repetition of important theory**
- **Has the lesson objective been achieved?**
- **How did the lesson go?**
- **Preview next lesson and exam**

