

Using the GRIT Hydrogen Technology Module in Education

The GRIT Hydrogen Technology lesson modules have been developed to provide students with a solid foundation in the principles, applications, and future potential of hydrogen as a sustainable energy carrier. These modules are designed to support both theoretical understanding and practical application, and are aligned with current developments in the energy transition.

1. Purpose of the Modules

The GRIT modules aim to introduce students to key aspects of hydrogen technology through three core components:

- **Introduction & Electrolysis**
Covers the basic principles of hydrogen production, including the properties of hydrogen as an element and the process of electrolysis.
- **Combustion**
Focuses on the use of hydrogen as a fuel in combustion engines and turbines, including safety considerations and energy efficiency.
- **Mobility**
Explores the role of hydrogen in transportation, including hydrogen-powered vehicles, infrastructure, and sustainable mobility concepts.

2. Structure and Sequence

Educators are advised to begin with the *Introduction & Electrolysis* module, as it lays the groundwork for understanding the subsequent topics. After completing this module, the remaining modules can be used in any order, depending on the focus of the course or the interests of the students.

3. Didactical Use

The GRIT Hydrogen Technology modules are designed with flexibility in mind, allowing educators to tailor their use to the specific needs of their students and educational context. Teachers can choose to implement the modules in a variety of ways, including:

- Theoretical instruction: to introduce key concepts and principles related to hydrogen technology.
- Practical assignments: to allow students to apply their knowledge in hands-on settings, such as lab work, simulations, or technical exercises.
- Project-based learning: to encourage deeper exploration through collaborative or individual projects that integrate multiple aspects of the module content.

Each module concludes with a set of open-ended questions. These can be used in multiple ways:

- As reflection prompts, helping students to critically assess what they have learned.
- As discussion starters, to facilitate classroom dialogue and peer learning.
- As assessment tools, either formative or summative, to evaluate student understanding and engagement.

This flexible structure ensures that the modules can be adapted to different teaching styles, learning environments, and educational levels, while maintaining a strong focus on relevance, engagement, and real-world application.

4. Curriculum Integration

These modules are suitable for integration into:

- Vocational education programs (VET)
- Applied sciences curricula
- Elective courses related to technology, energy, or mobility

They are particularly relevant for programs that address sustainability, innovation, and the energy transition.

5. Summary

- Begin with the *Introduction & Electrolysis* module
- Follow with *Combustion* and/or *Mobility* as appropriate
- Use the modules flexibly: theory, practice, or project work
- Conclude with reflection or assessment activities