

Didactic and methodological notes for:

Submodule 1: Final electrical test, commissioning and functional test of the solar thermal system

Goal of Submodule 1
<p>Objective:</p> <p>In this sub-module, the work steps for electrical commissioning of the solar thermal system are developed and the performance limits of both trades are considered. To complete this module, the main module of this learning unit should already have been completed.</p> <p>Introduction scenario:</p> <p>The solar system has now been fully installed and all that remains is the final commissioning and electrical inspection.</p> <p>Create a checklist of the tasks to be completed and the necessary tools. Use the existing technical documentation of the solar thermal system and your specialized materials as a reference.</p> <p>Target groups EQF level 3-4:</p> <p>Students</p> <ul style="list-style-type: none"> - plant mechanic / plumber - electrician

Competence profile related to the VQTS-Matrix			
Competence areas	Competence development steps	Level	Interdisciplinary / cross-disciplinary competences
Commissioning of building systems or their components	✓ He/she can commission technical building systems and configure them in accordance with customer requirements and prepare documentation and test reports in compliance with the applicable standards and specifications.	EQF 3-4	✓ The student knows the most important steps for the professional electrical commissioning of the solar thermal system with regard to their own performance limits and those of the other trades. ✓ Students understand the functional relationships between the most important components of the system and can assess the operating behavior.

Communication across trades, also in foreign languages	<ul style="list-style-type: none"> ✓ He/she can understand basic technical terms of his/her own and other professions. ✓ He/she can hold discussions with superiors and employees of his/her own and other trades as well as with customers in an appropriate manner and present and explain facts. 	EQF 3-4	<ul style="list-style-type: none"> ✓ Students understand the interface between their work and the work of other areas. ✓ The students can give self-confident feedback.
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Competence profile related to the matrix for sustainable thinking and acting	
Competence area	Competence development steps
<ul style="list-style-type: none"> ✓ Interdisciplinary collaboration: working efficiently in multidisciplinary teams, working with professionals from different fields to achieve common goals in terms of sustainability and environmental improvement. 	<ul style="list-style-type: none"> ✓ He/she works with others on basic tasks and understands the importance of working together to achieve sustainable goals. ✓ He/she coordinates and works in multidisciplinary teams.

Country	Where can the module be implemented in your national curriculum?
Germany	Vocational training for learning field 9 (installation of drinking water heating systems)
Finland	A unit based on local competences. The training provider defines the requirements for vocational competence and the assessment of competence in a similar way to the vocational units.
Spain	Heat-generating systems, installation and maintenance of solar energy systems.

In which way does the module enrich the content of one profession with qualification requirements from previously unrelated areas
<ul style="list-style-type: none"> ✓ Learners understand the functional relationships between the electrical, mechanical and hydraulic components of the solar thermal system and can therefore assess the operation of the system. ✓ The trainees learn about the necessary electrical and functional tests of the two trades and can differentiate between their own area of performance and the other trade. ✓ Electricians gain more expertise in solar thermal systems ✓ Learners communicate effectively with trainees from other professions.

Training plan Submodule 1			
Title of the lessons / individual	Competences	Duration / volume in training hours	Comments
Introduction and introduction to the learning situation		90 mins	Agreement on the scope and quality of the product to be created.
Information Phase	<ul style="list-style-type: none"> ✓ The students know the most important steps for "mechanical and electrical" commissioning of a solar thermal system. ✓ The students understand the interface between their work and the work of the other subject areas. ✓ The students learn how to check the electrical safety devices properly. 		The students look through the information material and use it to familiarise themselves with the most important components and functions of the solar thermal system.
Product creation	<ul style="list-style-type: none"> ✓ The students can document the work steps for electrical commissioning in a structured manner in the form of a checklist. 	30 mins	
Presentation	<ul style="list-style-type: none"> ✓ The students present their products to other students 	30 mins	The products are presented in plenary. The non-

	<p>from other trades, taking into account their own and new knowledge from the previous teaching phases.</p> <p>✓ The students can evaluate the product quality of the other groups based on criteria and make constructive suggestions for improvement.</p>		<p>presenting groups evaluate the presented checklist and give constructive feedback.</p>
Validation			<p>✓ The products are assessed by the teacher with regard to completeness, structure and the performance limits of both trades.</p>
Reflection / Evaluation	<p>✓ The students apply their new knowledge to create a joint checklist with the whole class.</p>	90 mins	<p>✓ The students check their newly acquired specialist knowledge when drawing up the joint checklist.</p> <p>✓ The last uncertainties are discussed and the last gaps in knowledge are closed.</p>

Description of the tasks for competence assessment

The assessment of competence growth can take the form of a written examination. This can also be combined with the main module and sub-modules 1 and 2 of this series of lessons on solar thermal energy.