



SPWS 201: Design of Solar Powered Water Systems

Syllabus

This online course guides participants step by step through the design of two separate Solar Powered Water Systems (SPWS). Using a fictional but realistic scenario, the course aims to provide practice in the design decisions and calculations SPWS engineers must make in the real world. Ultimately, the goal is to ensure the sustainability of SPWS as a means of providing water to underserved rural populations.

This course is intended for engineers who are involved or considering involvement in designing or procuring solar powered water systems. Prior experience with solar pumping products and configurations is not necessary, but a basic understanding of electromechanical pumping and pipe flow principles is required.

Instructional Approach

The instructional approach for this course may be different from what you are used to. Using a case-based simulation, you will take on the role of an SPWS design engineer who has been tasked with designing two systems: one for a rural community and the other for a nearby refugee camp. To accomplish your task, you will work through the five steps of the design process used for SPWS. As you work through each of the steps, you will record and document your design decisions and calculations in a design tool. Ultimately, this training methodology will better prepare you to transfer your learning to real-world situations than if a more traditional, lecture-based approach were used.

You should be prepared to spend between 6 – 8 hours completing the requirements for each unit.

Learning Outcomes

By the end of the course, you will be able to:

- Design an SPWS based on international standards and community expectations.
- Calculate the water demand for an SPWS.
- Determine the total dynamic head (TDH) of a water system at a given design flow.
- Select an appropriate pump for an SPWS project.
- Design a photovoltaic system for an SPWS project.



- Evaluate the design of an SPWS.

Expectations

This course is participatory. While you will study the content on your own time, you will be required to engage in active discussions in every module. These discussions will enrich your understanding of the content and allow you to interact with other professionals.

You will be assessed on three components to receive a certificate for the course.

- Participation: You must complete all units.
- Discussions: Your posts must be 75 - 150 words. You are also required to respond to **at least one** of your classmates' posts.
- Final exam: You must achieve 80% to pass the exam, but you may take the exam as many times as you wish.

Course Structure

Unit	Week #	Activities
Introductory Module & Unit 1: Getting Started	1	<ul style="list-style-type: none">• Pre-Course Survey• Course Introduction Lessons• E-Learning Modules• Discussion Forum
Unit 2: Determining Yield, Design Flow & TDH	2	<ul style="list-style-type: none">• E-Learning Modules• Discussion Forum
Unit 3: Selecting a Pump	3-4	<ul style="list-style-type: none">• E-Learning Modules• Discussion Forum

Unit 4: Designing the Photovoltaic System	5-6	<ul style="list-style-type: none">• E-Learning Modules• Discussion Forum• Final Exam• Post-Course Survey
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