

*Designed for:*

*The third year students of the sustainable energy department*

*Designed by:*

**Dr. Mahmoud Ismail**

*Date:*

23-5-2023

*Version:*

1.0

Dived do to the subtopics

- 1- The Sun constants and Parameters
- 2- The Sun radiation components
- 3- The Sun Angles Calculation
- 4- The Sun radiation calculations
- 5- The sun radiation mters

**Subject topic**

## **SOLAR ENERGY SYSTEMS**

Give basic information and  
important derivations in CT

Examples to work on or  
exercises students worked on  
  
Design experiments based on  
the basics in CT

# Flipped Course - Model Canvas

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<p><b>Key Partners</b> </p> <p>Who am I working for and with? Colleagues,  Students,  Professionals</p> <p>The course Title:  <b>SOLAR ENERGY SYSTEMS</b></p> <ul style="list-style-type: none"> <li>- This course is dedicated for the students of the third year students of the sustainable energy department.</li> <li>- Part of this course will be implemented with the solar lab supervisor</li> <li>-</li> </ul>	<p><b>Key Activities</b> </p> <p>What are the learning objectives</p> <p>How do I want my students to learn</p> <p>and to prove their skills and knowledge</p> <p><b>The course is divided into modules</b></p> <hr/> <p><b>Key Resources</b></p> <p>What are the resources I need to realize my FCA course?</p> <ul style="list-style-type: none"> <li>- Class Room</li> <li>- LCD Projector</li> <li>- Lab Equipment (Solar)</li> </ul>	<p><b>Value Propositions</b> </p> <p>What is my course about?</p> <p><b>SUN ENERGY</b></p> <p>How do I want to realize my course objectives?</p> <ul style="list-style-type: none"> <li>- F2F Lectures</li> <li>- Distant Learning</li> </ul> <p>What will my students know after having taken my course?</p> <p><b>Design and Installation of Solar PV systems</b></p>	<p><b>Target group relationship</b> </p> <p>Do I know the group of students already and if yes: what do I know about them?</p> <p><b>The students of the third year students of the sustainable energy department</b></p> <p><b>They should have background about power electronics and thermodynamic principles</b></p> <hr/> <p><b>Channels</b> </p> <p>How will I deliver my course content: via a learning path in Moodle</p> <p><b>Lecture Presentations</b></p> <p><b>Self implemented videos</b></p>	<p><b>Target group</b> </p> <p>Who am I creating this FCA course for?</p> <p>What is the group size?</p> <p><b>The students of the third year students of the sustainable energy department</b></p> <p><b>20-25 Students</b></p>
<p><b>Cost Structure</b></p> <p>What are the pitfalls for me and my students?</p> <ul style="list-style-type: none"> <li>- Different levels of students</li> </ul>	<p>What will be my time investment?</p> <ul style="list-style-type: none"> <li>- Preparing additional short videos and</li> </ul>	<p>What are my hard- and software needs?</p>	<p><b>Revenue Streams</b> </p> <p>How can I overcome the obstacles?</p> <p>What will my outcome be and what will be the outcome for my students?</p> <p>How will I evaluate the knowledge students gained from the F2F and the online content?</p>	

**Flipped Course - Storyboard Canvas:** Chart your course. Think about your objectives (what do you want to reach with your students → Bloom Taxonomy), your criteria of evaluation (how will you check this?) and your method of evaluation (how are you going to evaluate this?). How did you integrate Technology, Content, Pedagogy taking the Context into account → TPACK



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<p>Description of the course</p> <p>SOLAR ENERGY SYSTEMS</p> <p><b>MODULE 1</b> : The Sun Constants and Parameters– F2F Module</p>	<p>Module Objective 1</p> <p><b>Understand the main construction of our sun svstem</b></p>	<p>Online course content</p>	<p>Evaluation method online content</p> <p>Feedback</p> <p>Assessments</p> <p>Assignments</p>	<p>Target group:</p> <p><i>The third year students of the sustainable energy department students</i></p> 
<p>Proportion F2F and distance</p> <ul style="list-style-type: none"> <li>&lt;30% distance</li> <li>30 – 70% distance learning</li> <li>&gt; 70% distance learning</li> </ul>	<p>Module Objective 2</p> <p><b>Remember the sun parameters and constants (mass, radius, distance to earth, construction,...)</b></p>			
	<p>Module Objective 3</p> <p><b>Apply the main equations to calculate the power emitted from the Sun</b></p>	<p>F2F Module content</p> <p>All of the content of this module is F2F</p>	<p>Evaluation method F2F content</p> <p>Feedback</p> <p>Assessments</p> <p>Assignments</p> <ul style="list-style-type: none"> <li>Home exercise to calculate the sun constant for different days in a year.</li> </ul>	
<p>Group size</p> <ul style="list-style-type: none"> <li>Small</li> <li><b>Intermediate</b></li> <li>Large</li> </ul>	<p>Module Objective 4:</p> <p><b>Calculate the Sun constant</b></p> <p>Module Objective 5:</p> <p><b>Analyze the calculate result of the sun constant in comparison with the measured one.</b></p>			
<p>Needs</p> <p>Class room</p> <p>LCD Projector</p>	<p>Outcome of this module</p> <p>Ability to describe the sun parameters</p> <p>Ability to define the sun constant</p>			

<b>Module</b>	<b>F2F or @home</b>	<b>Estimated time</b>
<b>Module 1</b> <b>Theory</b>	<b>@home</b>	<b>30 minutes</b>
<b>Module 2</b> <b>Advantages and pitfalls</b>	<b>@home</b>	<b>20 minutes</b>
<b>Module 3</b> <b>Get inspired</b>	<b>F2F (online or in class)</b>	<b>15' introduction</b> <b>45' class discussion</b>
<b>Module 4</b> <b>Types and needs</b>	<b>@home</b>	<b>10 minutes</b>
<b>Module 5</b> <b>Learning paths and LMS</b>	<b>F2F (online or in class)</b>	<b>40 minutes theory</b> <b>20 minutes peer learning</b>
<b>Module 6</b> <b>Concept creation</b>	<b>F2F (online or in class)</b>	<b>60 minutes</b> <b>Models + preparing ideas for own concept</b>
<b>Model 6 bis</b> <b>Assignment: concept creation for an own FCA course</b>	<b>@home</b>	<b>At own pace</b>

