



INDIA'S FIRST UNIVERSITY FOR STARTUP

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# VALUE ADDED COURSE

**Swarinim Institute of Technology**

**NAME OF SUBJECT:-  
Designing Solar Systems for Homes**

**SUBJECT CODE :- VACDSSH**

**Year: 2019-2020**

**Semester:- Odd**



**Swarinim Institute of Technology**  
**Swarinim Startup & Innovation University**  
University Campus, Bhoyan Rathod, Near ONGC WSS, Opp. IFCCO, Adalaj Kalol Highway,  
Gandhinagar, Gujarat, INDIA 382420 Phone: 095123 43333

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## Subject: Designing Solar Systems for Homes (VACDSSH)

<b>Program:</b>	Bachelor of Engineering	<b>Branch:</b>	All
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**Hours:- 36 hrs.**

### Objective:-

- Understand the fundamentals of solar energy and photovoltaic systems.
- Learn to design and size solar systems for residential applications.
- Understand system components, installation, and maintenance requirements.
- Develop skills to assess solar potential and energy needs of homes.
- Familiarize with industry standards, codes, and regulations.

### Detail Syllabus

Sr.	Content	Total Hrs
1	<b>Module 1: Introduction to Solar Energy</b> <ul style="list-style-type: none"> <li>✓ Solar radiation and energy fundamentals</li> <li>✓ Photovoltaic effect and PV systems</li> <li>✓ - Advantages and limitations of solar energy</li> </ul>	05
2	<b>Module 2: Solar System Components</b> <ul style="list-style-type: none"> <li>✓ Solar panels and modules</li> <li>✓ Inverters and power conditioning units</li> <li>✓ Mounting structures and tracking systems</li> <li>✓ - Batteries and energy storage systems</li> </ul>	05
3	<b>Module 3: System Design and Sizing</b> <ul style="list-style-type: none"> <li>✓ Assessing solar potential and energy needs</li> <li>✓ System sizing and configuration</li> <li>✓ Load calculation and energy efficiency measures</li> </ul>	05
4	<b>Module 4: Installation and Maintenance</b> <ul style="list-style-type: none"> <li>✓ Installation requirements and best practices</li> <li>✓ System commissioning and testing</li> <li>✓ Maintenance and troubleshooting procedures</li> </ul>	05
5	<b>Module 5: Industry Standards and Regulations</b> <ul style="list-style-type: none"> <li>✓ International and local codes and standards</li> <li>✓ Permitting and inspection requirements</li> <li>✓ Safety guidelines and electrical codes</li> </ul>	05
6	<b>Module 6: Case Studies and Design Exercises</b> <ul style="list-style-type: none"> <li>✓ Real-world examples and design challenges</li> <li>✓ Group discussions and problem-solving exercises</li> <li>✓ Designing solar systems for various home types and locations</li> </ul>	06

7.	<b>Module 8: Final Project and Assessment</b> <ul style="list-style-type: none"> <li>✓ Designing a solar system for a residential building</li> <li>✓ Presenting and discussing design projects</li> <li>✓ Final assessment and course evaluation</li> </ul>	05
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### Reference Books:

Sr. No.	Author/s	Name of the Book	Publisher
1	Md. Fahim Hasan Khan	Design of a solar home system	-----
2	Dan Chiras	"Solar Power Systems for Homes"	-----
3	-----	Solar Power for Homes: A Guide to Design, Installation, and Cost"	U.S. Department of Energy
4	-----	Designing and Installing Solar Systems for Homes	National Renewable Energy Laboratory (NREL)
5	-----	Solar Systems for Homes: A Guide to Design, Installation, and Maintenance	International Renewable Energy Agency (IRENA)

### Online Resources:

Here are some online resources for designing solar systems for homes:

1. National Renewable Energy Laboratory (NREL): Offers a variety of tools and resources, including the System Advisor Model (SAM) and the PVWatts Calculator.
2. U.S. Department of Energy: Provides resources on solar energy, including design and installation guides, and the Solar Energy Technologies Office.
3. Solar Energy Industries Association (SEIA): Offers resources on solar energy, including design and installation guides, and policy and regulatory information.
4. International Renewable Energy Agency (IRENA): Provides resources on renewable energy, including solar energy, and offers training and capacity building programs.
5. PVWatts Calculator: A tool for estimating the energy output of a solar system.

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