QUALIFICATION FILE – Standalone NOS

Entrepreneurship in Solar Water Heater Manufacturing

☒ Horizontal/Generic ☐ Vertical/Specialization

☐ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☐ For ToA

☐General ☐ Multi-skill (MS) ☒ Cross Sectoral (CS) ☐ Future Skills

NCrF/NSQF Level: 3.5

NOS Code: IID/N0053

Submitted By: Samadhan Samiti

2nd Floor, Siddhivinayak Building, 27/1/B Samadhan Tower, Gokhale Marg Lucknow – 226001

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>NOS-Qualification Name</td><td colspan="2">Entrepreneurship in Solar Water Heater Manufacturing</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Environmental Science</td></tr>
<tr><td>3.</td><td>Type of Qualification: ☒ New ☐ Revised</td><td>NQR Code & version of existing/previous qualification: N/A</td><td>Qualification Name of existing/previous version: N/A</td></tr>
<tr><td>4.</td><td>National Qualification Register (NQR) Code &Version
(Will be issued after NSQC approval)</td><td>NG-3.5-ES-03447-2024-V1-SS</td><td>5. NCrF/NSQF Level: 3.5</td></tr>
<tr><td>6.</td><td>Brief Description of the Standalone NOS</td><td colspan="2">The qualification for Entrepreneurship in Solar Water Heater Manufacturing is designed to equip individuals with the essential skills and knowledge to establish and manage their own small enterprise in the solar water heater manufacturing sector. It focuses on the technical aspects of solar water heater production, including system components, assembly, and quality standards, along with key entrepreneurial competencies such as business planning, marketing, financial management, and supply chain operations. The program also introduces learners to regulatory frameworks, intellectual property protection, and government initiatives promoting renewable energy ventures, enabling them to build sustainable and efficient solar water heater businesses.</td></tr>
<tr><td>7.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1</td><td>Class 11 Pass</td><td>1 Years of Experience</td></tr>
<tr><td colspan="3">or</td></tr>
<tr><td>2</td><td>Class 10 Pass</td><td>1.5* Years of Experience</td></tr>
<tr><td colspan="3">or</td></tr>
<tr><td>3</td><td>Class 8 Pass</td><td>4.5* Years of Experience</td></tr>
<tr><td colspan="3">or</td></tr>
<tr><td>4</td><td>NSQF Level 3 in relevant field</td><td>1.5* Years of Experience</td></tr>
</table>
b. Age: 'As per the Govt. Norms'
* (In relevant Industry)</td></tr>
<tr><td>8.</td><td>Credits Assigned to this NOS-Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>3</td><td>9. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
</table>

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<table>
<tr><td>10.</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td>N/A</td></tr>
<tr><td>11.</td><td>Training Duration by Modes of Training Delivery
(Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td>☐ Offline Only ☐ Online Only ☒ Blended
<table>
<tr><th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>0</td><td>30</td><td>30</td></tr>
<tr><td>Online</td><td>60</td><td>0</td><td>60</td></tr>
<tr><td>Total</td><td>60</td><td>30</td><td>90</td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>12.</td><td>Assessment Criteria Summary</td><td>
<table>
<tr><th>Theory (Marks)</th><th>Practical (Marks)</th><th>Project (Marks)</th><th>Viva (Marks)</th><th>Total (Marks)</th><th>Passing %age</th></tr>
<tr><td>116</td><td>0</td><td>48</td><td>16</td><td>180</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>13.</td><td>Is the NOS Amenable to Persons with Disability</td><td>☐ Yes ☒ No If “Yes”, specify applicable type of Disability:</td></tr>
<tr><td>14.</td><td>Progression Path After Attaining the Qualification, wherever applicable (Please show Professional and Academic progression)</td><td>N/A</td></tr>
<tr><td>15.</td><td>How participation of women will be encouraged?</td><td>• Preference for Women Entrepreneurs in various Government Schemes like PMEGP and Stand-Up India.
• Additional Subsidy to Women in PMEGP and Many CMEGP Schemes.
• Additional Support for Women in Rural Development Schemes.</td></tr>
<tr><td>16.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td>N/A</td></tr>
<tr><td>17.</td><td>Is similar NOS available on NQR-if yes, justification for this qualification</td><td>☐ Yes ☒ No URLs of similar Qualifications:</td></tr>
<tr><td>18.</td><td>Name and Contact Details of Submitting / Awarding Body SPOC
(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</td><td colspan="2">Name: Samadhan Samiti
Email: mayank@iid.org.in Contact No.: +91-8595940536
Website: https://www.iid.org.in</td></tr>
<tr><td>19.</td><td>Final Approval Date by NSQC: 17th December 2024</td><td>20. Validity Duration: Three Years</td><td>21. Next Review Date: 16th December 2027</td></tr>
</table>

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Section 2: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	MBA with Bachelor's Degree in Mechanical or Electrical or Renewable Energy Engineering from UGC Recognized University with more than 5 years of business or consultancy experience in the relevant field. OR Bachelor's Degree from any Government Recognized University with more than 7 years of business or consultancy experience in the relevant field. OR 12th Pass with relevant Industry experience of 10 years. OR Entrepreneurs in relevant fields with 7 Years of experience
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	MBA with Bachelor's Degree in Mechanical or Electrical or Renewable Energy Engineering from UGC Recognized University with more than 7 years of business experience in the relevant field.
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised NOS, details of Any Upskilling Required for Trainer**	N/A

Section 3: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	**Technical:** Assessment shall be carried out by NCVET-recognized Assessors having MBA with Bachelor's Degree in Mechanical or Electrical or Renewable Energy Engineering from UGC Recognized University with 3 years of experience in relevant qualification. **and**

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		Domain: Entrepreneurs with 5 years of experience in relevant filed.
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	MBA with Bachelor's Degree in Mechanical or Electrical or Renewable Energy Engineering from UGC Recognized University and have relevant experience of proctoring in any qualification. **or** Entrepreneurs with 7 years of experience in relevant filed and have relevant experience of proctoring in any qualification.
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Assessment shall be carried out by NCVET-recognized Assessors having MBA with Bachelor's Degree in Mechanical or Electrical or Renewable Energy Engineering from UGC Recognized University with more than 5 years of business experience in the relevant field.
4.	**Assessment Mode** *(Specify the assessment mode)*	**Online MCQ Assessment, Project Assessment and Viva**
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 4: Evidence of the Need for the Standalone NOS

Provide Annexure/Supporting documents name.

1.	Government /Industry initiatives/ requirement (Yes/No): **Yes,** Annexure: Government Initiatives to Promote Solar Water Heater Business
2.	Number of Industry validation provided: 30, Annexure: Industry Validations Summary
3.	Estimated number of people to be trained: **1000**
4.	Evidence of Concurrence/Consultation with Line/State Departments (In case of regulated sectors): (Yes/No): **Yes**

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Section 5: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure: NCrF/NSQF level justification based on NCrF/NSQF descriptors (Mandatory)**	Annexure: Evidence of Level
2.	**Annexure: List of tools and equipment relevant for NOS (Mandatory, except in case of online course)**	Annexure: Tools and Equipment
3.	**Annexure: Performance and Assessment Criteria (Mandatory)**	1.Annexure: Standalone NOS- Performance Criteria details 2.Annexure: Assessment Criteria
4.	**Annexure: Assessment Strategy (Mandatory)**	Annexure: Assessment Strategy
5.	**Annexure: Blended Learning (Mandatory, in case selected Mode of delivery is Blended Learning)**	Annexure: Blended Learning
6.	**Annexure: Acronym and Glossary (Optional)**	Annexure: Acronym and Glossary
7.	**Annexure/Supporting Document: Standalone NOS- Performance Criteria Details Annexure/Document with PC-wise detailing as per NOS format (Mandatory- Public view)**	Annexure: Government Initiatives to Promote Solar Water Heater Business
8.	**Supporting Document: Model Curriculum (Mandatory – Public view)**	Model Curriculum Entrepreneurship in Solar Water Heater Manufacturing

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Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	• The qualification provides structured theoretical knowledge in solar energy concepts, manufacturing systems, and business fundamentals related to solar water heater production. • The learner is expected to understand solar radiation principles, types of collectors, classifications of systems, material quality, and energy efficiency norms. • Includes awareness of raw materials, standards, maintenance, safety, and sustainability associated with solar water heater manufacturing. • Business-side theory includes basics of procurement, marketing, budgeting, risk management, and global export considerations.	• At NSQF Level 3.5, the role requires foundational knowledge in renewable energy principles and structured business planning. • The theoretical component emphasizes understanding and applying core principles in a real-world, small enterprise context. • The qualification covers regulatory awareness, compliance, and quality frameworks without requiring advanced technical design knowledge.	3.5
Professional and Technical Skills/ Expertise/ Professional Knowledge	• The learner is trained to perform production-related tasks such as component assembly, raw material inspection, handling tools and equipment, and conducting basic quality checks. • Familiarity with maintenance, calibration, system installation, and performance testing is developed through hands-on learning. • Learners handle packaging, mounting, and efficient resource usage including waste and time management. • Technical responsibility includes basic troubleshooting and preventive actions to ensure product reliability.	• NSQF Level 3.5 supports development of practical skills that are refined and repeatable within structured routines. • The job role includes decision-making in manufacturing operations, while adhering to standard procedures. • Responsibilities extend to process monitoring, inspection, and using judgment within defined boundaries.	3.5
Employment Readiness & Entrepreneurship	• The course builds capacity for setting up and managing a small-scale solar water heater manufacturing unit. • Learners are introduced to procurement strategy, inventory control, distributor engagement, and branding.	• Level 3.5 involves structured entrepreneurial readiness where the learner operates semi-independently within an organized framework.	3.5

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Skills & Mind-set/Professional Skill	• Skills include basic project planning, managing customer expectations, and understanding government schemes and export strategies. • The qualification enables learners to create and sustain a commercially viable product line in the green technology sector.	• Decision-making is limited to operational and functional levels with increasing exposure to market and customer-oriented thinking. • Employment readiness aligns with sustainable manufacturing and product positioning responsibilities.	
Broad Learning Outcomes/Core Skill	• The qualification provides exposure to managing assembly, production cycles, team tasks, and customer relationships. • Learners apply financial tools, prepare project reports, analyze market trends, and optimize inventory and logistics in structured formats. • Operational efficiency and safety are emphasized alongside quality, environment, and compliance awareness. • Skills are applied across business planning, documentation, coordination, and entry-level supervision.	• NSQF Level 3.5 reflects the learner's ability to apply core skills across interconnected domains such as manufacturing, marketing, and finance. • Learning outcomes include managing structured operations, interpreting information, and delivering quality work with limited support. • Planning, reporting, and minor troubleshooting reflect a balanced mix of knowledge and application.	3.5
Responsibility	• The learner is accountable for own tasks in production, quality checks, safety, basic machine maintenance, and team coordination. • Responsibilities include following manufacturing SOPs, managing daily schedules, maintaining hygiene, and ensuring equipment reliability. • The role requires basic reporting, documentation, and supplier or distributor engagement at a foundational level. • There is an emphasis on upholding environmental, safety, and ethical standards.	• Level 3.5 reflects growing responsibility in delivering consistent outputs and ensuring process adherence in a structured unit. • The candidate may lead simple tasks or monitor small production activities without managerial oversight. • Responsibility lies in operational quality, stakeholder coordination, and business sustainability within predefined systems.	3.5

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Annexure: Tools and Equipment (lab set-up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Computer / Laptop	8 GB RAM, 12 GHZ total processing speed, 2 GB Graphics memory.	30
2	Microsoft Office	365	30

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Laptop
2. Projector
3. Whiteboard
4. Whiteboard Marker
5. Whiteboard Duster

Annexure: Industry Validations Summary

No.	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID
1	Eyconic Solar Pvt.Ltd.	Ankit Singh	Owner	C101, Third Floor, C Block, Sector 10, Noida, Uttar Pradesh 201301	9098939012	kabhishek85@gmailcom
2	Green Seal pvt Ltd	Manish Shah	Director	Unit 103, Nanda Industrial Estate, Sativali Highway, Near Bajrang Dhaba,, Vasai East, Mumbai-401208,	8048558265	mineshcontact11@gmail.com
3	Heaven Institute Pvt Ltd	Amiya Krishna Pandya	CEO	Mahadev Chowk, Anupam Square, 204, Mota Varachha, Surat, Gujarat 394101	9831633226	heaveninstitute07@gmail.com
4	Jay Ganga Solar energy Pvt Ltd	Vimal Patel	Director	Manufacturer, 2 Kailashpati Society, 80 Feet Road New Nehru Nagar Main Road, Dhebar Rd, Atika Industrial Area, Rajkot, Gujarat 360002	9909323239	jaigangasolar@gmail.com

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5	Green Sense energy system	Prashant Prakash Jatap	Director	Shop No. 4, Rajarani Apartment, Padampura Waluj, MIDC, Waghole, Konkanwadi, Aurangabad-431001, Maharashtra, India	8888411117	subhash@greensense.com
6	Solar India Enterprises	Ritam Saiymar	CEO	M-5/4-5-6, Vishal Market, West Mukherjee Nagar, Delhi - 110 009	9811606202	solarindia0009@gmail.com
7	Shivam Solar Power	Pankaj Kumar Pandey	Director	35-A, Pratap Enclave, Gurudwara Road, Mohan Garden, New Delhi, Uttam Nagar, Delhi, 110059	9312838751	cmashivamindia@gmail.com
8	Suryajyoti Renewable Pvt Ltd	Debojyoti Sen	MD	Pal Bagan, Hridaypur, Near Jai Guru Bhawan, Kolkata-700127	9717088074	solar@ganpatiproduct.com
9	Urja Sathi	Surbhi Singh	Manager	D, 2/101, Vibhuti Khand, Gomti Nagar, Lucknow, Uttar Pradesh 226010	8887421559	ayodhyawasicorp@gmail.com
10	Ushnaurja energy India Pvt Ltd	Shreedhara H	Director	A28, 12th Cross Rd, 3rd Stage, Maruthi Nagar, Peenya, Bengaluru, Karnataka 560058	9611965001	avisolartech@gmail.com
11	Satyam Enterprises	Satyaveer Singh	Director	174,Avas vikas colony civil line moradabad	9412235433	satyam.mbd@gmail.com
12	Jaganlite india Pvt Ltd	Parag Mishra	Director	509,New Hyderabad RBL road lucknow uttar pradesh 226007	9990327190	info@jaganlite.com
13	Satya SOlar System Private Limited	Parth Gupta	Director	2nd floor business park 1 naaval kishor rd hazrat ganj lucknow uttar pradesh 226001	8069831922	info@satyasolarsystem.com
14	Vortex Solar Energy Private Limited	Dharmendra Singh	Director	B- 98 First floor sector C, wireless square mahanagar lucknow 226006	9682805554	gosolar@vortexsolar.in
15	Sun Moon Power	Bal Krishan Aggarwal	Director	313/39/1, Lalit Tondon marg chowk lucknow uttar pradesh 226003	9839980889	info@sunmoonpower.com
16	Sun Steller	Davinder Taluja	Director	Tehsil khasra no 12/21 & 22 jalapur -1 sanoli jalapur road bapauli haryana 132103	9143917917	info@mehergroup.com
17	Emmvee Solar System Private Limited	D.V. Manjunath	Director	# 13/1, international airport road bettahalaspur post, bengaluru 562157	8022174333	info@emmvee.in
18	Superme Solar Water Heater	H Narasimha pai	Director	687 cross road bengaluru karnatak 560064	9379661979	enquiry@supremesolar.in
19	Sudarshan Saur Shakti Private Limited	Sanjay Shridharrao	Director	Ranjangaon Shenpunji, waluj chhatrapati sambhaji nagar maharashtra 431131	9146010678	works@sudarshansaur.com
20	Racold Thermo Ltd	Ramnath	Director	Gate no 264/talegaon chakan pune 410501	7362888999	customer.care@racold.com
21	Redren Energy Pvt Ltd	Jignesh Kumar	Director	2625. Road D-5 kranti gate GIDC, Metoda Rajkot gujarat 360021	9925992552	info@redren.in
22	Jain Irigation system ltd	Shri Anil bhavarlal jain	Director	NH 53 bambhori taluka dharangaon dist jalgaon 425002	8048370632	jainmumbai@jains.com
23	Nuetech solar system pvt ltd	Surendera kumar	Director	# 9/15 yearappa industrial magadi main rd kernataka 562130	9243144444	sales@nuetechsolar.com

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24	Chanrlok International Pvt ltd	Kanan Gupta	Director	114, Daryaganj new delhi 110002	8048987567	chandrlok@hotmail.com
25	Om Energy Equipment	Bharat	Director	150 feet ring rd opp mavdi chowkdi rajkot gujarat 360004	8048966788	info@deltasolars.com
26	Jai SUnlight System	Gunabalan	Proprietor	228J 73G swami lay out tamil nadu 641033	8048614689	
27	Ushna urja Energy india pvt ltd	Somashekhar	Director	A 28 12th cross maruthi nagar peenya bengaluru kernatak 560058	9611965001	manjunath.s@avisolar.com
28	Powertrac Industries Limited	Bharat sinha	Director	702 ,703 31 five B/H Divyabhaskar house highway 380059	8048601544	info@powertracgroup.com
29	Ram Solar	Manish Sharma	Director	12/432 Indira Nagar Lucknow	9559681111	ramsolarwe@gmail.com
30	Royal India Solar	Abhishek Basra	Director	B-3/105, Radhasoami Satsant (Beas) Road, 200 Meter Ahead from Fortune Hotel, (Next to Dera Mor, Chatterpur-Bhati Road) Bhati, New Delhi	9891926299	royalindiasolar@gmail.com

Annexure: Training Details

Training Projections:

Year	Estimated Training # of Total Candidates	Estimated training # of Women	Estimated training # of People with Disability
2024-2025	200	10	0
2025-2026	400	20	0
2026-2027	400	20	0

Data to be provided year-wise for next 3 years.

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Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the NOS	List Recommended Tools – for all Selected Components	Offline: Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	LMS and its associated resources: Preferably integrated with ABs own LMS Solution	0:1
2	☐Imparting Soft Skills, Life Skills and Employability Skills /Mentorship to Learners	NA	NA
3	☒Showing Practical Demonstrations to the learners	LMS and its associated resources: Preferably integrated with ABs own LMS Solution	1:0
4	☐Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	NA	NA
5	☒Tutorials/ Assignments/ Drill/ Practice	LMS and its associated resources: Preferably integrated with ABs own LMS Solution	1:1
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations	LMS and its associated resources: AAs own LMS Solution Preferably integrated with ABs own LMS Solution	1:3
7	☐On the Job Training (OJT)/ Project Work Internship/ Candidate Training	NA	NA

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Annexure: Standalone NOS- Performance Criteria details

1. **Description:**
   Entrepreneurship in Solar Water Heater Manufacturing involves the establishment and operation of small-scale enterprises focused on producing solar water heaters. This sector is ideal for entrepreneurs with limited capital but a strong commitment to renewable energy and sustainability. Micro entrepreneurs in this field design, manufacture, and market solar water heaters, leveraging local resources and innovative manufacturing techniques to produce efficient, cost-effective, and environmentally friendly products. The business typically serves residential, commercial, and institutional clients, contributing to energy conservation and promoting green technology. This venture allows for adaptability and scalability, providing a pathway for entrepreneurs to grow their business while addressing the increasing demand for sustainable water heating solutions.

2. **Scope**:
   The scope covers the following:
   - Analyze characteristics of successful entrepreneurial ventures and learn lessons from market leaders.
   - Gain foundational knowledge in solar energy, radiation, solar-thermal principles, and their application in solar water heater technology.
   - Learn about raw materials, quality standards, and inspection associated with solar water heater manufacturing.
   - Understand machine, equipment, and infrastructure requirements for solar water heater production and optimization techniques.
   - Acquire basic machine maintenance and calibration techniques to ensure consistent product quality.
   - Understand the importance of insulation materials, temperature control, and regulation for efficient solar water heater performance.
   - Create procurement strategies for sourcing raw materials and components, and ensure a reliable supply chain for manufacturing needs.
   - Develop logistics and inventory management strategies, and optimize inventory levels to meet production and market demand.
   - Identify market trends and opportunities in the solar water heater manufacturing business and develop effective sales and marketing strategies.
   - Develop strategies to forecast sales and plan for demand in the solar water heater manufacturing business to optimize inventory and resource allocation.
   - Apply theoretical knowledge to real-world scenarios and analyze data collected during the project.
   - Enhance writing and presentation skills through the creation of a professional project report.

3. **Elements and Performance Criteria:**

Introduction to Solar Energy, Radiation, Solar-Thermal Principles, and its Application
To be competent, the user/individual in the business must be able to:
PC1. Understand the basic concepts and significance of solar energy.

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PC2. Factors affecting solar radiation: atmospheric conditions, geographic location, time of day/year.
PC3. Basic concepts of heat transfer: conduction, convection, and radiation.
PC4. Applications of Solar-Thermal Energy.

Introduction to Types of Solar Collectors
To be competent, the user/individual in the business must be able to:
PC5. Understand the fundamental principles of solar collectors.
PC6. Study about the different types of solar collectors and their operating mechanisms.
PC7. Explore the efficiency and performance parameters of each collector type.
PC8. Identify the applications and suitability of various solar collectors.

Working Principle of Solar Water Heater and Its Classification
To be competent, the user/individual in the business must be able to:
PC9. Understand the basic working principles of solar water heaters.
PC10. Learn about the different classifications of solar water heaters.
PC11. Explore the design, operation, and efficiency of various solar water heater types.
PC12. Identify the appropriate applications for each type of solar water heater.

Understanding the Importance of Heat transfer Fluids and their types
To be competent, the user/individual in the business must be able to:
PC13. Understand the fundamental principles of heat transfer and the critical role of heat transfer fluids.
PC14. Learn about the different types of heat transfer fluids and their properties.
PC15. Explore the criteria for selecting appropriate heat transfer fluids for specific applications.
PC16. Analyze the performance and efficiency implications of various heat transfer fluids.

Introduction to Solar Water Heater Assembly Components and Possible Design Types
To be competent, the user/individual in the business must be able to:
PC17. Identify the key components: solar collectors, storage tanks, heat exchangers, controllers, and circulation pumps, etc.
PC18. Understand the integration and interaction of components within the system.
PC19. Explore the design types of solar water heater.
PC20. Identify the steps in assembling a solar water heater.

Selection Criteria for Solar Water Heater

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To be competent, the user/individual in the business must be able to:

PC21. Learn the techniques to evaluate different solar water heating systems based on performance metrics.
PC22. Explore the impact of environmental and site-specific conditions on system choice.
PC23. Identify the system design and configuration based on specific application needs.
PC24. Identify the economic and maintenance considerations in selecting solar water heaters.

Solar Water Heater Raw Materials

To be competent, the user/individual in the business must be able to:

PC25. Understand the key raw materials used in solar water heater components.
PC26. Learn about the properties and selection criteria for these materials.
PC27. Explore the impact of material choices on system performance and longevity.
PC28. Identify the sustainability and environmental considerations in material selection.

Quality Standards and Inspection Associated to Raw Materials

To be competent, the user/individual in the business must be able to:

PC29. Understand the importance of quality standards in the selection of raw materials for solar water heaters.
PC30. Learn about the specific standards and certifications applicable to solar water heater materials.
PC31. Explore the inspection and testing methods used to ensure material quality.
PC32. Documentation and traceability requirements for quality assurance.

Machine, Equipment and Infrastructure Requirement for Solar Water Heater Manufacturing

To be competent, the user/individual in the business must be able to:

PC33. Understand the key machinery and equipment used in the manufacturing of solar water heaters.
PC34. Learn about the infrastructure requirements for a solar water heater manufacturing facility.
PC35. Identify the methods of Site selection and facility planning.
PC36. Identify the best practices for setting up and maintaining a manufacturing facility.

Solar Water Heater Manufacturing Process

To be competent, the user/individual in the business must be able to:

PC37. Understand the complete manufacturing process of solar water heaters.
PC38. Learn the specific steps involved in producing each component of a solar water heater.
PC39. Explore the technologies and equipment used in the manufacturing process.
PC40. Analysis of successful manufacturing facilities.

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Basic Machine Maintenance and Calibration Techniques
To be competent, the user/individual in the business must be able to:
PC41. Understand the importance of regular machine maintenance and calibration.
PC42. Learn basic maintenance procedures and troubleshooting techniques.
PC43. Gain knowledge of calibration methods for various types of manufacturing equipment.
PC44. Develop best practices for maintaining and calibrating equipment in a solar water heater manufacturing facility.

Finished Solar Water Heater Testing, Performance Reporting and Packaging Methods
To be competent, the user/individual in the business must be able to:
PC45. Understand the importance of testing and performance reporting for finished solar water heaters.
PC46. Learn about various testing methods to ensure product quality and reliability.
PC47. Identify and gain knowledge in compiling and interpreting performance reports.
PC48. Explore effective packaging methods to protect solar water heaters during transportation and storage.

Safety and Health Standards in Solar Water Heater Manufacturing
To be competent, the user/individual in the business must be able to:
PC49. Understand the importance of safety and health standards in manufacturing.
PC50. Learn about key regulations and guidelines for workplace safety and health.
PC51. Develop skills in risk assessment and the implementation of safety protocols.
PC52. Explore best practices for maintaining a safe and healthy work environment.

Troubleshoots Analysis in Solar Water Heater Manufacturing
To be competent, the user/individual in the business must be able to:
PC53. Understand the impact of unresolved issues on product quality and manufacturing efficiency.
PC54. Identify the common issues and their causes in solar water heater manufacturing process
PC55. Understand the techniques for identifying the underlying causes of problems.
PC56. Explore effective solutions and preventive measures to address and avoid issues.

Solar Water Heater Mounting and Installation Techniques
To be competent, the user/individual in the business must be able to:
PC57. Understand the importance of proper mounting and installation of solar water heaters.
PC58. Learn the techniques for assessing installation sites and selecting appropriate mounting systems.

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PC59. Explore the methods in installing solar water heater components securely and efficiently.
PC60. Explore safety measures and best practices to ensure reliable operation.

Implementing Waste Management Techniques for Solar Water Heater Business
To be competent, the user/individual in the business must be able to:
PC61. Identify waste streams generated during solar water heater manufacturing and installation.
PC62. Manage and recycle materials like glass, metals, and plastics.
PC63. Develop methods for safe disposal of electronic components and batteries.
PC64. Collaborate with recycling facilities for handling production waste.

Identifying Market Trends and Opportunities in the Solar Water Heater Business
To be competent, the user/individual in the business must be able to:
PC65. Learn how to conduct market research to gather insights into customer preferences, industry trends, and competitive dynamics.
PC66. Analyzing demand drivers such as government policies, energy costs, and consumer preferences.
PC67. Analyze market research findings to identify opportunities for business growth, product innovation, and marketing strategy development.
PC68. Use market research data to identify emerging market segments and opportunity.

Developing Effective Sales and Marketing Strategies for the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC69. Understand the unique challenges and opportunities in sales and marketing for the solar water heater manufacturing business.
PC70. Identifying target markets and customer segments based on demographic, geographic, and psychographic factors.
PC71. Identify and develop a sales strategy tailored to the unique selling points and benefits of solar water heater products.
PC72. Implement targeted marketing campaigns and messaging to reach and engage specific customer segments effectively.

Sales Forecasting and Demand Planning in the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC73. Understand the importance of sales forecasting and demand planning for effective inventory management and resource allocation.
PC74. Learn different techniques and models for sales forecasting and demand planning.
PC75. Develop skills in analyzing market trends, customer behaviour, and external factors affecting demand.
PC76. Explore strategies for optimizing inventory levels, production schedules, and supply chain efficiency based on sales forecasts and demand projections.

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Developing Risk Management Strategies for the Solar Water Heater Manufacturing Business

To be competent, the user/individual in the business must be able to:

PC77. Understand the importance of risk management in the context of solar water heater manufacturing.
PC78. Learn different techniques and frameworks for identifying, assessing, and prioritizing risks.
PC79. Learn to develop risk mitigation strategies and contingency plans.
PC80. Explore strategies for integrating risk management into overall business planning and decision-making processes.

Developing Procurement Strategies for Raw Materials and Components in the Solar Water Heater Manufacturing Business

To be competent, the user/individual in the business must be able to:

PC81. Understand the role and importance of procurement in solar water heater manufacturing.
PC82. Learn different sourcing strategies and supplier selection criteria.
PC83. Develop skills in negotiating contracts, managing supplier relationships, and ensuring supply chain resilience.
PC84. Explore strategies for sustainable procurement and responsible sourcing practices.

Developing Strategies for Solar Water Heater Logistics and Inventory Management

To be competent, the user/individual in the business must be able to:

PC85. Understand the importance of logistics and inventory management for ensuring timely delivery, minimizing costs, and optimizing supply chain efficiency.
PC86. Learn different techniques and strategies for optimizing transportation, warehousing, and inventory control.
PC87. Develop skills in demand forecasting, inventory planning, and supply chain optimization.
PC88. Explore strategies for improving supply chain visibility, responsiveness, and resilience.

Building and Maintaining Effective Distributor Relationships in the Solar Water Heater Manufacturing Business

To be competent, the user/individual in the business must be able to:

PC89. Understand the significance of distributor relationships in solar water heater manufacturing.
PC90. Learn strategies for identifying, selecting, and onboarding distributors.
PC91. Develop skills in managing and motivating distributors to maximize sales performance.
PC92. Explore techniques for fostering long-term, mutually beneficial partnerships with distributors.

Budgeting and Financial Planning Techniques in the Solar Water Heater Manufacturing Business

To be competent, the user/individual in the business must be able to:

PC93. Understand the importance of budgeting and financial planning in solar water heater manufacturing.

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PC94. Learn different budgeting techniques and financial forecasting methods.
PC95. Develop skills in analyzing financial statements, evaluating investment opportunities, and managing cash flow.
PC96. Explore strategies for aligning financial planning with business objectives and maximizing profitability.

Revenue Management Techniques for the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC97. Understand the principles and importance of revenue management in solar water heater manufacturing.
PC98. Learn different revenue management techniques and pricing strategies.
PC99. Develop skills in market segmentation, demand forecasting, and pricing optimization.
PC100. Explore strategies for aligning revenue management with business objectives and maximizing profitability.

Implementing Time Management Strategies in the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC101. Understand the importance of time management in solar water heater manufacturing.
PC102. Learn different time management techniques and productivity strategies.
PC103. Develop skills in analyzing production processes, identifying inefficiencies, and implementing improvements.
PC104. Explore strategies for optimizing workflow, minimizing downtime, and meeting production schedules.

Human Resources Management in the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC105. Understand the importance of human resources management in solar water heater manufacturing Industry.
PC106. Learn different HRM functions, including recruitment, training, performance management, and employee relations.
PC107. Develop skills in talent acquisition, workforce development, and employee engagement.
PC108. Explore strategies for building a high-performing and motivated workforce in the solar water heater manufacturing sector.

Implementing Strategies for Export and International Market Development for the Solar Water Heater Manufacturing Business
To be competent, the user/individual in the business must be able to:
PC109. Understand the importance of export and international market development in solar water heater manufacturing.
PC110. Learn different strategies for market research, market entry, and market expansion.
PC111. Develop skills in identifying target markets, building distribution networks, and managing international trade relationships.
PC112. Explore strategies for overcoming challenges and capitalizing on opportunities in global markets.

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Manage Branding and Promotion of Business

To be competent, the user/individual in the business must be able to:

PC113. Analyze the target audience to determine their preferences and behavior.
PC114. Define the brand's mission, vision, and unique selling proposition (USP).
PC115. Design a comprehensive branding strategy aligned with business objectives.
PC116. Utilize market research tools to assess competitors' branding and promotional strategies.

Detailed Project Report on Solar Water Heater Manufacturing Business.

To be competent, the user/individual in the business must be able to:

PC117. Capability to plan and propose a project effectively.
PC118. Proficiency in selecting and utilizing appropriate research methods and collecting data.
PC119. Competence in analyzing and interpreting data accurately.
PC120. Ability to write and structure a comprehensive project report.
PC121. Understanding of the solar water heater market.
PC122. Ability to manage financial projections and cash flow management.
PC123. Ability to interpret research findings and draw conclusions.
PC124. Presentation and communication skills to present project objectives, findings, and recommendations clearly.

4. Knowledge and Understanding (KU):

The individual in the business needs to know and understand:

KU1. Research and analysis
KU2. Economic and business terminology
KU3. Creative thinking techniques
KU4. Brainstorming and ideation
KU5. Innovation management
KU6. Project management
KU7. Business planning
KU8. Financial modeling
KU9. Market research
KU10. Risk assessment
KU11. Legal research
KU12. Documentation and filing
KU13. Local, state, and central regulations

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KU14. Budgeting and financial management
KU15. Resourcefulness and ingenuity
KU16. Negotiation
KU17. Time management
KU18. Government programs and policies
KU19. Grant writing
KU20. Market analysis
KU21. Strategic planning
KU22. Benchmarking
KU23. Competitive analysis
KU24. Basic business management
KU25. Industry knowledge
KU26. Technical knowledge of car cleaning
KU27. Equipment handling
KU28. Safety protocols
KU29. Quality control
KU30. Surface preparation techniques
KU31. Use of cleaning products and equipment
KU32. Environmental regulations
KU33. Market segmentation
KU34. Customer profiling
KU35. Data analysis
KU36. Business model development
KU37. Business Compliance
KU38. Documentation and record-keeping
KU39. Digital marketing
KU40. Brand management
KU41. Social media marketing
KU42. Content creation
KU43. Business plan writing
KU44. Financial projections

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5. Generic Skills (GS):

User/individual in business needs to know how to:

GS1. Critical Thinking
GS2. Communication Skills
GS3. Adaptability
GS4. Problem-solving
GS5. Networking
GS6. Creative Thinking
GS7. Open-mindedness
GS8. Collaboration
GS9. Curiosity
GS10. Risk-taking
GS11. Decision-making
GS12. Time Management
GS13. Perseverance
GS14. Resourcefulness
GS15. Resilience
GS16. Positive Attitude
GS17. Self-reflection
GS18. Stress Management
GS19. Flexibility
GS20. Attention to Detail
GS21. Research Skills
GS22. Patience
GS23. Negotiation Skills
GS24. Persuasion
GS25. Leadership
GS26. Analytical Thinking
GS27. Physical Stamina
GS28. Empathy
GS29. Social Media Skills
GS30. Creativity

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Annexure: Assessment Criteria

Detailed PC-wise assessment criteria and assessment marks for the NOS are as follows:

No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
1.	Introduction to Solar Energy, Radiation, Solar-Thermal Principles, and its application	Understand the basic concepts and significance of solar energy.	1	0	0	1
		Factors affecting solar radiation: atmospheric conditions, geographic location, time of day/year.	1	0	0	1
		Basic concepts of heat transfer: conduction, convection, and radiation.	1	0	0	1
		Applications of Solar-Thermal Energy.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
2.	Introduction to Types of Solar Collectors	Understand the fundamental principles of solar collectors.	1	0	0	1
		Study about the different types of solar collectors and their operating mechanisms.	1	0	0	1
		Explore the efficiency and performance parameters of each collector type.	1	0	0	1
		Identify the applications and suitability of various solar collectors.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
3.	Working Principle of Solar Water Heater and Its Classification	Understand the basic working principles of solar water heaters.	1	0	0	1
		Learn about the different classifications of solar water heaters.	1	0	0	1
		Explore the design, operation, and efficiency of various solar water heater types.	1	0	0	1
		Identify the appropriate applications for each type of solar water heater.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
4.	Understanding the Importance of Heat transfer Fluids and their types	Understand the fundamental principles of heat transfer and the critical role of heat transfer fluids.	1	0	0	1
		Learn about the different types of heat transfer fluids and their properties.	1	0	0	1
		Explore the criteria for selecting appropriate heat transfer fluids for specific applications.	1	0	0	1
		Analyze the performance and efficiency implications of various heat transfer fluids.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
5.	Introduction to Solar Water Heater Assembly Components and Possible Design Types	Identify the key components: solar collectors, storage tanks, heat exchangers, controllers, and circulation pumps, etc.	1	0	0	1
		Understand the integration and interaction of components within the system.	1	0	0	1
		Explore the design types of solar water heater.	1	0	0	1
		Identify the steps in assembling a solar water heater.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
6.	Selection Criteria for Solar Water Heater	Learn the techniques to evaluate different solar water heating systems based on performance metrics.	1	0	0	1
		Explore the impact of environmental and site-specific conditions on system choice.	1	0	0	1
		Identify the system design and configuration based on specific application needs.	1	0	0	1
		Identify the economic and maintenance considerations in selecting solar water heaters.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
7.	Solar Water Heater Raw Materials	Understand the key raw materials used in solar water heater components.	1	0	0	1
		Learn about the properties and selection criteria for these materials.	1	0	0	1
		Explore the impact of material choices on system performance and longevity.	1	0	0	1
		Identify the sustainability and environmental considerations in material selection.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
8.	Quality Standards and Inspection Associated to Raw Materials	Understand the importance of quality standards in the selection of raw materials for solar water heaters.	1	0	0	1
		Learn about the specific standards and certifications applicable to solar water heater materials.	1	0	0	1
		Explore the inspection and testing methods used to ensure material quality.	1	0	0	1
		Documentation and traceability requirements for quality assurance.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
9.	Machine, Equipment and Infrastructure Requirement for Solar Water Heater Manufacturing	Understand the key machinery and equipment used in the manufacturing of solar water heaters.	1	0	0	1
		Learn about the infrastructure requirements for a solar water heater manufacturing facility.	1	0	0	1
		Identify the methods of Site selection and facility planning.	1	0	0	1
		Identify the best practices for setting up and maintaining a manufacturing facility.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
10.	Solar Water Heater Manufacturing Process	Understand the complete manufacturing process of solar water heaters.	1	0	0	1
		Learn the specific steps involved in producing each component of a solar water heater.	1	0	0	1
		Explore the technologies and equipment used in the manufacturing process.	1	0	0	1
		Analysis of successful manufacturing facilities.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
11.		Understand the importance of regular machine maintenance and calibration.	1	0	0	1
		Learn basic maintenance procedures and troubleshooting techniques.	1	0	0	1

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
	Basic Machine Maintenance and Calibration Techniques	Gain knowledge of calibration methods for various types of manufacturing equipment.	1	0	0	1
		Develop best practices for maintaining and calibrating equipment in a solar water heater manufacturing facility.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
12.	Finished Solar Water Heater Testing, Performance Reporting and Packaging Methods	Understand the importance of testing and performance reporting for finished solar water heaters.	1	0	0	1
		Learn about various testing methods to ensure product quality and reliability.	1	0	0	1
		Identify and gain knowledge in compiling and interpreting performance reports.	1	0	0	1
		Explore effective packaging methods to protect solar water heaters during transportation and storage.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
13.	Safety and Health Standards in Solar Water Heater Manufacturing	Understand the importance of safety and health standards in manufacturing.	1	0	0	1
		Learn about key regulations and guidelines for workplace safety and health.	1	0	0	1
		Develop skills in risk assessment and the implementation of safety protocols.	1	0	0	1
		Explore best practices for maintaining a safe and healthy work environment.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
14.	Troubleshoots Analysis in Solar Water Heater Manufacturing	Understand the impact of unresolved issues on product quality and manufacturing efficiency.	1	0	0	1
		Identify the common issues and their causes in solar water heater manufacturing process	1	0	0	1
		Understand the techniques for identifying the underlying causes of problems.	1	0	0	1
		Explore effective solutions and preventive measures to address and avoid issues.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
15.	Solar Water Heater Mounting and Installation Techniques	Understand the importance of proper mounting and installation of solar water heaters.	1	0	0	1
		Learn the techniques for assessing installation sites and selecting appropriate mounting systems.	1	0	0	1
		Explore the methods in installing solar water heater components securely and efficiently.	1	0	0	1
		Explore safety measures and best practices to ensure reliable operation.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
16.	Implementing Waste Management Techniques for Solar Water Heater Business	Identify waste streams generated during solar water heater manufacturing and installation.	1	0	0	1
		Manage and recycle materials like glass, metals, and plastics.	1	0	0	1
		Develop methods for safe disposal of electronic components and batteries.	1	0	0	1
		Collaborate with recycling facilities for handling production waste.	1	0	0	1

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
		Total Marks	**4**	**0**	**0**	**4**
17.	Identifying Market Trends and Opportunities in the Solar Water Heater Business	Learn how to conduct market research to gather insights into customer preferences, industry trends, and competitive dynamics.	1	0	0	1
		Analyzing demand drivers such as government policies, energy costs, and consumer preferences.	1	0	0	1
		Analyze market research findings to identify opportunities for business growth, product innovation, and marketing strategy development.	1	0	0	1
		Use market research data to identify emerging market segments and opportunity.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
18.	Developing Effective Sales and Marketing Strategies for the Solar Water Heater Manufacturing Business	Understand the unique challenges and opportunities in sales and marketing for the solar water heater manufacturing business.	1	0	0	1
		Identifying target markets and customer segments based on demographic, geographic, and psychographic factors.	1	0	0	1
		Identify and develop a sales strategy tailored to the unique selling points and benefits of solar water heater products.	1	0	0	1
		Implement targeted marketing campaigns and messaging to reach and engage specific customer segments effectively.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
19.	Sales Forecasting and Demand Planning in the Solar Water Heater Manufacturing Business	Understand the importance of sales forecasting and demand planning for effective inventory management and resource allocation.	1	0	0	1
		Learn different techniques and models for sales forecasting and demand planning.	1	0	0	1
		Develop skills in analyzing market trends, customer behaviour, and external factors affecting demand.	1	0	0	1
		Explore strategies for optimizing inventory levels, production schedules, and supply chain efficiency based on sales forecasts and demand projections.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
20.	Developing Risk Management Strategies for the Solar Water Heater Manufacturing Business	Understand the importance of risk management in the context of solar water heater manufacturing.	1	0	0	1
		Learn different techniques and frameworks for identifying, assessing, and prioritizing risks.	1	0	0	1
		Learn to develop risk mitigation strategies and contingency plans.	1	0	0	1
		Explore strategies for integrating risk management into overall business planning and decision-making processes.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
21.	Developing Procurement Strategies for Raw	Understand the role and importance of procurement in solar water heater manufacturing.	1	0	0	1
		Learn different sourcing strategies and supplier selection criteria.	1	0	0	1

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
	Materials and Components in the Solar Water Heater Manufacturing Business	Develop skills in negotiating contracts, managing supplier relationships, and ensuring supply chain resilience.	1	0	0	1
		Explore strategies for sustainable procurement and responsible sourcing practices.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
22.	Developing Strategies for Solar Water Heater Logistics and Inventory Management	Understand the importance of logistics and inventory management for ensuring timely delivery, minimizing costs, and optimizing supply chain efficiency.	1	0	0	1
		Learn different techniques and strategies for optimizing transportation, warehousing, and inventory control.	1	0	0	1
		Develop skills in demand forecasting, inventory planning, and supply chain optimization.	1	0	0	1
		Explore strategies for improving supply chain visibility, responsiveness, and resilience.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
23.	Building and Maintaining Effective Distributor Relationships in the Solar Water Heater Manufacturing Business	Understand the significance of distributor relationships in solar water heater manufacturing.	1	0	0	1
		Learn strategies for identifying, selecting, and onboarding distributors.	1	0	0	1
		Develop skills in managing and motivating distributors to maximize sales performance.	1	0	0	1
		Explore techniques for fostering long-term, mutually beneficial partnerships with distributors.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
24.	Budgeting and Financial Literacy Techniques in the Solar Water Heater Manufacturing Business	Understand the importance of budgeting and financial planning in solar water heater manufacturing.	1	0	0	1
		Learn different budgeting techniques and financial forecasting methods.	1	0	0	1
		Develop skills in analyzing financial statements, evaluating investment opportunities, and managing cash flow.	1	0	0	1
		Explore strategies for aligning financial planning with business objectives and maximizing profitability.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
25.	Revenue Management Techniques for the Solar Water Heater Manufacturing Business	Understand the principles and importance of revenue management in solar water heater manufacturing.	1	0	0	1
		Learn different revenue management techniques and pricing strategies.	1	0	0	1
		Develop skills in market segmentation, demand forecasting, and pricing optimization.	1	0	0	1
		Explore strategies for aligning revenue management with business objectives and maximizing profitability.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
26.		Understand the importance of time management in solar water heater manufacturing.	1	0	0	1

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
	Implementing Time Management Strategies in the Solar Water Heater Manufacturing Business	Learn different time management techniques and productivity strategies.	1	0	0	1
		Develop skills in analyzing production processes, identifying inefficiencies, and implementing improvements.	1	0	0	1
		Explore strategies for optimizing workflow, minimizing downtime, and meeting production schedules.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
27.	Human Resources Management in the Solar Water Heater Manufacturing Business	Understand the importance of human resources management in solar water heater manufacturing Industry.	1	0	0	1
		Learn different HRM functions, including recruitment, training, performance management, and employee relations.	1	0	0	1
		Develop skills in talent acquisition, workforce development, and employee engagement.	1	0	0	1
		Explore strategies for building a high-performing and motivated workforce in the solar water heater manufacturing sector.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
28.	Implementing Strategies for Export and International Market Development for the Solar Water Heater Manufacturing Business	Understand the importance of export and international market development in solar water heater manufacturing.	1	0	0	1
		Learn different strategies for market research, market entry, and market expansion.	1	0	0	1
		Develop skills in identifying target markets, building distribution networks, and managing international trade relationships.	1	0	0	1
		Explore strategies for overcoming challenges and capitalizing on opportunities in global markets.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
29.	Manage Branding and Promotion of Business	Analyze the target audience to determine their preferences and behavior.	1	0	0	1
		Define the brand's mission, vision, and unique selling proposition (USP).	1	0	0	1
		Design a comprehensive branding strategy aligned with business objectives.	1	0	0	1
		Utilize market research tools to assess competitors' branding and promotional strategies.	1	0	0	1
		Total Marks	**4**	**0**	**0**	**4**
30.	Detailed Project Report on Solar Water Heater Manufacturing Business.	Capability to plan and propose a project effectively.	0	6	2	8
		Proficiency in selecting and utilizing appropriate research methods and collecting data.	0	6	2	8
		Competence in analyzing and interpreting data accurately.	0	6	2	8
		Ability to write and structure a comprehensive project report.	0	6	2	8
		Understanding of the solar water heater market.	0	6	2	8
		Ability to manage financial projections and cash flow management.	0	6	2	8

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No.	Module Names	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Project Marks	Viva Marks	Total Marks
		Ability to interpret research findings and draw conclusions.	0	6	2	8
		Presentation and communication skills to present project objectives, findings, and recommendations clearly.	0	6	2	8
		Total Marks	**0**	**48**	**16**	**64**
Total Marks for NOS Qualification			**116**	**48**	**16**	**180**

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Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Mention the detailed assessment strategy in the provided template.

Assessment Overview: The purpose of this assessment SOP is to provide a structured and transparent process for evaluating students for the qualification "Entrepreneurship in Solar Water Heater Manufacturing Business." This process aims to identify candidates who possess the skills, knowledge, and potential to excel in this field, ensuring that only the most suitable students are selected.

To achieve this, the assessment will be conducted through a multi-faceted approach, including a written assessment, case study analysis, MCQ based segment-wise final tests, development, and evaluation of a comprehensive project report based on experiential learning, and a viva voice examination on the project work undertaken by the students.

Assessment Methods: The assessment for the online course "Entrepreneurship in Solar Water Heater Business" involves a multi-faceted approach to thoroughly evaluate candidates' qualifications and suitability. The key methods include:

- **Written Assessment:** The written assessment is an online test designed to evaluate candidates' knowledge of solar water heater technology, business concepts, and industry trends. This test emphasizes technical understanding, analytical skills, and theoretical knowledge relevant to the course. Candidates are required to complete written assignments and case studies simulating scenarios encountered in the solar water heater industry, which assess their critical thinking, problem-solving, and decision-making skills.

- **Case Study Analysis:** Candidates are provided with real-world scenarios related to solar water heater entrepreneurship. They are expected to analyze these cases, identify problems, propose solutions, and demonstrate their problem-solving and decision-making skills. This method assesses the practical application of theoretical knowledge and entrepreneurial thinking.

- **MCQ-Based Segment-Wise Final Tests:** Multiple-choice questions (MCQs) are used to test candidates' knowledge and understanding across different segments of the course. These tests are structured to evaluate comprehension of key concepts, retention of information, and the ability to apply knowledge in various contexts. The final test comprises MCQs covering each module of the qualification, assessing candidates' overall knowledge and comprehension of the course material.

- **Development and Evaluation of a Comprehensive Project Report:** Candidates must develop a detailed project report based on experiential learning, involving real-world application, research, planning, and execution related to solar water heater manufacturing and entrepreneurship. The project report is evaluated for originality, depth of analysis, feasibility of the business plan, and practical insights. This assessment measures candidates' ability to apply theoretical knowledge in a practical context.

- **Viva Voce Examination on the Project Work:** The viva voce is an oral examination that assesses candidates' understanding of their project, their ability to defend their work, clarity of thought, and communication skills. It also evaluates their critical thinking and responsiveness to feedback, ensuring a comprehensive understanding and practical capability in solar water heater entrepreneurship.

Assessment Criteria: The assessment criteria for each assessment method will be aligned with the learning outcomes of the qualification. Criteria may include:

- **Technical Knowledge:** Evaluation of understanding of solar water heater technology and application of theoretical concepts.
- **Business Concepts:** Assessment of knowledge related to business management, market analysis, and entrepreneurship.
- **Analytical Skills:** Ability to analyze information, draw conclusions, and solve problems effectively.
- **Problem Identification:** Skill in identifying key issues and challenges in the provided case study.

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- **Solution Development:** Creativity and feasibility of proposed solutions.
- **Critical Thinking:** Ability to evaluate different aspects of the case and provide a well-reasoned analysis.
- **Application of Knowledge:** Ability to apply theoretical knowledge to practical scenarios.
- **Retention of Information:** Demonstration of retention and understanding of key concepts.
- **Project Planning and Execution:** Thoroughness and feasibility of the business plan and project execution.
- **Research and Analysis:** Depth of research, data collection, and analysis presented in the report.
- **Understanding of Project:** Depth of understanding and clarity of thought regarding the project work.
- **Overall Presentation:** Confidence, clarity, and professionalism during the viva voce examination.

Assessment Schedule: Assessment tasks will be distributed throughout the duration of the qualification to ensure ongoing feedback and opportunities for improvement. The final project report and viva voice examination will typically be scheduled towards the end of the qualification, allowing students to integrate and apply their learning from the entire program.

Assessment Integrity: To ensure the integrity of the assessment process, all assessments will be conducted in accordance with the institution's policies and procedures. Measures will be in place to prevent plagiarism and cheating, and assessments will be marked by qualified and impartial assessors, as elaborated in Qualification File.

Conclusion: The assessment strategy outlined above aims to provide a rigorous and comprehensive evaluation of students' knowledge, skills, and competencies in managing a car wash business. By combining written assignments, tests, project work, and viva voice examinations, the assessment strategy ensures that students are well-prepared to succeed in the dynamic and competitive car wash industry.

Annexure: Government Initiatives to Promote Solar Water Heater Business

1. **Introduction:** The Indian government has launched a significant initiative to rapidly integrate solar power into its renewable energy system. Recognizing the immense potential of solar energy to address the challenges of energy security, environmental sustainability, and economic development, substantial efforts have been undertaken to bolster solar energy projects nationwide. Through the strategic integration of policy interventions, financial incentives, technological advancements, and capacity-building initiatives, the government is fostering an enabling environment for the swift deployment of solar energy infrastructure across the country.

2. **Government Initiatives for Solar and Renewable Energy Sector, thus driving demand for Solar Water Heater:**

a) **Jawaharlal Nehru National Solar Mission (JNNSM) or National Solar Mission (NSM) -** The Jawaharlal Nehru National Solar Mission (JNNSM), or the National Solar Mission, is an initiative of the Government of India and State Governments to promote solar power in India. Inaugurated in January 2010, the JNNSM has been revised twice and now boasts a target of 100 GW of solar PV by 2022. The objective of JNNSM is to establish India as a global leader in solar energy by creating the policy conditions for its deployment across the country. Currently, the bulk of India's solar PV industry is dependent on imports of critical raw materials and components – including silicon wafers. Transforming India into a solar energy hub would include a leadership role in low-cost, high-quality solar manufacturing, including balance

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of system components. The comprehensive approach of JNNSM is set to significantly strengthen India's solar energy and renewable energy sector. By fostering a robust domestic solar manufacturing industry, India can reduce its dependence on imports and create a self-sustaining solar ecosystem. This transition not only supports the national economy through job creation and technological innovation but also promotes environmental sustainability by curbing greenhouse gas emissions. Moreover, the increased focus on solar energy infrastructure will likely spur demand for related technologies, such as solar water heaters, which are integral to maximizing the utility of solar power in residential and industrial applications. Overall, the JNNSM is paving the way for a more resilient, sustainable, and economically viable energy future for India.

b) **PLI Scheme 'National Programme on High Efficiency Solar PV Modules':** The scheme aims to build an ecosystem for the manufacturing of high-efficiency solar PV modules in India, thereby reducing import dependence in the renewable energy sector. The objectives of the scheme include the following:

- To build up solar PV manufacturing capacity of high-efficiency modules.
- To bring cutting-edge technology to India for manufacturing high-efficiency modules. The scheme will be technology agnostic, allowing all technologies, but will incentivize those that yield better module performance.
- To promote the setting up of integrated plants for better quality control and competitiveness.
- To develop an ecosystem for sourcing local materials in solar manufacturing.
- To generate employment and achieve technological self-sufficiency.

The comprehensive objectives of this scheme are composed to significantly strengthen India's solar energy and renewable energy sectors. By fostering a robust domestic solar manufacturing industry, India can reduce its dependence on imports and create a self-sustaining solar ecosystem. This strategic initiative will not only support the national economy through job creation and technological innovation but also enhance environmental sustainability by reducing greenhouse gas emissions. The increased focus on solar energy infrastructure will likely drive demand for related technologies, such as solar water heaters, which are essential for optimizing the use of solar power in residential, commercial, and industrial applications. Overall, the scheme is set to bolster the resilience, sustainability, and economic viability of India's energy future.

c) **PM Surya Ghar Muft Bijli Yojana:** In February 2024, the Indian government launched a new rooftop solar program scheme called the PM Surya Ghar Muft Bijli Yojana. This scheme aims to install rooftop solar panels in one crore (ten million) households and provide them with several benefits, including:

- Free electricity: Up to 300 units of free electricity every month.
- Financial assistance: Subsidies covering up to 40% of the installation cost.
- Income from surplus power: The ability to sell excess electricity generated by the panels back to the grid.

The PM Surya Ghar Muft Bijli Yojana is set to significantly strengthen India's solar energy and renewable energy sectors. By incentivizing the adoption of rooftop solar panels, the scheme promotes energy self-sufficiency at the household level, reducing dependence on traditional power sources and lowering electricity bills for millions

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of families. The financial assistance and income from surplus power provide substantial economic benefits, making solar energy an attractive and viable option for a broad segment of the population. Additionally, this initiative is likely to drive increased demand for complementary technologies, such as solar water heaters, which can further optimize the use of solar power in homes. Overall, the scheme supports the national goals of enhancing energy security, fostering sustainable development, and stimulating economic growth through the widespread adoption of renewable energy solutions.

d) **PM Kusum Yojna -** The PM-KUSUM scheme has three Components as detailed below:

- **Under Component-A** of the Scheme the farmers can set-up solar plant of 500 kW to 2 MW capacity on his barren land situated within 5 km of distribution sub-station. The power generated will be purchased by the DISCOM at a pre-fixed tariff. This component is being implemented by DISCOMs.
- **Component-B** of the Scheme provides for installation of 20 lakh standalone Solar Powered Agriculture Pumps in the Country. This component is being implemented by the NRE Department Haryana.
- **Component-C** of the Scheme provides for solarization of Agriculture feeders. The surplus solar power generated will be purchased by DISCOM and the amount will be credited to farmer's bank account for repayment of loan. This component is being implemented by DISCOMs.
- **Off-Grid Solar Pumps under PM-KUSUM (Component-B):** Under this scheme, standalone solar agriculture pumps (Surface/Submersible) of capacity 3 HP, 5HP, 7.5 HP and 10 HP pumps shall be provided with 75% subsidy for irrigation purpose only, the subsidy pattern is as under: -.

⇒ Capacity User Share MNRE Subsidy State Subsidy

By providing substantial subsidies and facilitating the setup of solar infrastructure, these initiatives promote the adoption of solar technology in agriculture, thereby reducing the sector's dependence on conventional energy sources. This strategic move enhances energy security, promotes environmental sustainability, and offers financial benefits to farmers. Moreover, the increased adoption of solar technology is likely to drive demand for related innovations, such as solar water heaters, further supporting the growth of the renewable energy market in India. Overall, these measures contribute to a more resilient, sustainable, and economically vibrant energy landscape in the country.

3. **Government Support for Solar Water Heater Entrepreneurship:**

a) **MNRE Capital Subsidy Scheme:** The Ministry of New and Renewable Energy (MNRE) offers capital subsidies for the installation of solar water heaters. Entrepreneurs can avail of these subsidies to reduce the initial investment cost, making it easier to set up manufacturing or installation businesses. The subsidy amount varies based on the capacity and type of solar water heater.

b) Stand-Up India Scheme: The Stand-Up India Scheme, launched by the Government of India, aims to promote entrepreneurship among women and SC/ST communities by providing bank loans ranging from INR 10 lakhs to INR 1 crore for setting up greenfield enterprises. The scheme supports a wide range of sectors, including manufacturing, services, and trading, and offers a credit guarantee mechanism to facilitate access to financial resources. For the solar water heater business,

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the Stand-Up India Scheme provides essential financial support to cover production, distribution, and installation costs. This facilitates the entry and growth of diverse entrepreneurs in the renewable energy market, promoting innovation, competitiveness, and the broader adoption of sustainable energy solutions in India.

c) **Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGTMSE):** The Credit Guarantee Fund Scheme for Micro and Small Enterprises (CGTMSE) provides collateral-free credit to new and existing micro and small enterprises, with loans up to INR 2 crores. It aims to enhance credit delivery and support entrepreneurship by removing the need for collateral security or third-party guarantees. In the solar water heater business, CGTMSE facilitates entrepreneurship development by lowering entry barriers, enabling investment in advanced technologies, and promoting innovation. This scheme contributes to the growth and sustainability of the solar energy industry in India.

d) **Small Industries Development Bank of India (SIDBI) Loans:** SIDBI offers loans tailored for MSMEs, including those in the renewable energy sector, providing financial assistance for setting up new ventures, expanding existing businesses, or meeting working capital needs. In the solar water heater business, SIDBI loans support entrepreneurship by financing manufacturing units, procuring equipment, and investing in innovation. This financial support accelerates business growth and contributes to the development of the solar energy sector in India.

e) **State-Specific Schemes:** Various states in India offer their own schemes and subsidies to promote renewable energy and entrepreneurship. For instance, states like Karnataka, Maharashtra, and Tamil Nadu provide additional subsidies and financial support for the installation and manufacturing of solar water heaters. Entrepreneurs should check with their respective state renewable energy departments for specific schemes and incentives available.

4. **Conclusion:**

The Indian government's comprehensive support for the renewable and solar energy sectors, exemplified by initiatives like the MNRE Capital Subsidy Scheme, Stand-Up India Scheme, CGTMSE, and SIDBI Loans, has a profound impact on fostering entrepreneurship and accelerating business growth. By providing subsidies, loans, and favorable policies, these schemes lower entry barriers for aspiring entrepreneurs and encourage the adoption of solar water heaters. This support creates a conducive environment for entrepreneurship in the solar water heater business, driving innovation, enhancing product quality, and expanding market reach. Overall, government initiatives in the renewable energy sector indirectly benefit entrepreneurship in solar water heating, contributing to India's sustainable energy transition.

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Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.

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