



**SOLAR RESEARCH CENTER  
(SGIARC)**

**SSGMCE, Shegaon**

**Under The Guidance: -Dr. Ajay Kumar Damral**

**SHRI SANT GAJANAN MAHARAJ COLLEGE OF  
ENGINEERING, SHEGAON**

**SOLAR RESERCH CENTER**

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**R&D Projects**

<b>Sr. No.</b>	<b>Project Title</b>
1	Hydrogen Generation using Animal Waste
2	An Improved Solar Chula for Water Purification, Cooking &Power.
3	The Green Breath for Survival of Mankind In 21 <sup>st</sup> Century Using Sustainable Air Purifier
4	Lakshman Rekha Surksha Kavach
5	Smart Irrigation System with Solar Power and GSM Technology
6	E-bicycle Solar Charging Station
7	Verstile Agriculture Device
8	Solar Water Pump
9	Power Generation by Using Railway Infrastructure
10	Increasing The Efficiency of Solar Panel by Using Solar Tracker
11	Hybrid solar power system
12	Rameshwaram Sterilization and Drying Unit



Title: - Rameshwaram Sterilization and Drying Unit

Under the Guidance: - Dr. Ajay Kumar Damral



Title: - Hydrogen Generation using Animal Waste Biogas

Under the Guidance: - Dr. Ajay Kumar Damral





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Title: - An Improved Solar Chula for Water Purification,  
Cooking & Power.

Under the Guidance: - Dr.Ajay Kumar Damral



Title: - An Improved Solar Chula For Water Purification ,  
Cooking &Power.

Under the guidance :- Dr.Ajay Kumar Damral



Title: - E-bicycle Solar Charging Station

Under the guidance :- Dr.Ajay Kumar Damral



Title: - Solar Water Pump

Under the guidance :- Dr.Ajay Kumar Damral



**Title: - The Green Breath For Survival of Mankind In 21<sup>st</sup> Century Using Sustainable Air Purifier**

**Under the guidance :- Dr.Ajay Kumar Damral**



Title: - Power Generation By Using Railway Infrastructure

Under the guidance :- Dr.Ajay Kumar Damral



Title: - Hybrid Solar Power System

Under the guidance :- Dr.Ajay Kumar Damral

## **Research Lab**

- Designed and developed solar P.V. cell testing Laboratory
- Designed and developed solar P.V. cell cutting Unit.
- Designed and developed solar P.V module laminator lab and curing lab.
- Designed and developed solar P.V module testing lab.
- Designed and developed solar E.S. Bank lab.
- Designed and developed solar P.C.B. lab.

## B.E Projects

Sr. No.	PROJECT YEAR	PROJECT TITLE
1	2009-2010	Automatic sun tracking system
2	2010-2011	Automatic Solar energy tracking system
3	2010-2011	Advanced tracking and enery boosting For solar power system Techfest 2011 Reg. Id. <b>En1149</b>
4	2012 – 2013	Design and Development of Efficient Photovoltaic System
5	2012-2013	Design and modification of solar powered rickshaw
6	2014-2015	Design And Development Of Efficient Model of Solar Cooking System
7	2016-2017	Utilisation of solar energy for waste management
8	2017-2018	Power generation by using railway electric poles
9	2017-2018	Effective storage and utilization of renewable energy
10	2017– 2018	Solar tracker :an approach towards maximum power Generation
11	2020-2021	Solar water pumping system
12	2020-2021	Development of evecuated tube collector by increasing its Efficiency
13	2021-2022	Development of Solar Based Smart Charging Station
14	2021-2022	Design And Development of Smart Emergency Detection System for a Hospital
15	2021-2022	Rameshwaram
16	2022-2023	Power generation through Biogas
17	2022-2023	Development of solar based charging station for E- bicycle
18	2022-2023	Solar Cooking System
19	2023-2024	The Green Breath for the Survival of Mankind in 21 <sup>st</sup> Century Using Sustainable Air Purifier Air Purification

		<ul style="list-style-type: none"> <li>• Design &amp; development of P.V. Cells, P.V. Module &amp; Energy Storage Bank for Solar Power Systems.</li> <li>• Hybrid Energy Storage Device</li> <li>• Development of White Coal from Agricultural Waste</li> <li>• Development &amp; Analysis of Efficient Hybrid Power System Using PV Cell &amp; Fuel Cell</li> <li>• Design &amp; Development Of Biogas Power Plant ( BPP )</li> <li>• Motivated various student from various discipline is take active part in solar product development.</li> <li>• Design &amp; developed a solar charging station for automobile.</li> <li>• Solar street lights and solar home lighting implemented in different places in Maharashtra (India)</li> <li>• Solar power plant 1, 3, 5, 10, 25, 100, 200 Kw. implemented in Maharashtra (India)</li> </ul>
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### **Expert Lectures Delivered:**

- 1) Title: National Seminar on Solar Energy and Applications
  - Date: 22 Feb 2024
  - Institute: Electrical Engineering Department Baba Gulam Saha Badsha University Rajouri (J&K).
- 2) Title: Planning Of Solar Power Plant (50KW) (Pilot Project)
  - Date: 12 Nov 2013
  - Organized by: Garrison Engineer 881 Indian Army at Poonch (J&K)
- 3) Title: Solar Energy & Business Opportunity in renewable energy for Indian Army, Assam
  - One week Hands -On Training programme Indian army Assam.
  - Date: 8-8-2022 to 18-8-2022
- 4) Title: Training Programme for Indian Army, Assam
  - One week Hands -On Training programme Indian army Assam.
  - Date: 22 Mar 2021
- 5) Title: Basics of Solar Power Plant
  - Date: 17 Feb 2019
  - Organized by: Electrical Engg. Dept. Visvesvaraya National Institute of Technology, Nagpur, Maharashtra.
  - Name of Workshop: Advancement in Renewable Energy and Energy Storage Devices”
- 6) Title: NISE sponsored training course on “Rooftop Solar Grid Engineer”
  - Organized by: Electrical Engg .Dept. Government College of Engg, Nagpur, Maharashtra.
  - Date: 29 Jan 2019

7) Title: Solar Power Systems Basic

- Name of Workshop: Advancements In Renewable Energy And Energy Storage Devices
- Organized by: Visvesvaraya National Institute of Technology, Nagpur, Maharashtra.
- Date: 17 Feb 2017

8) Title: Practical /hands on installation of grid connected SPV power plant

- Name of Workshop: NISE sponsored training course on “Rooftop Solar Grid Engineer”
- Organized by: Electrical Engg .Dept. Government College of Engg, Nagpur, Maharashtra.
- Date: 30 Jan 2019

9) Title: “Solar Energy”

- Name of Workshop: Recent Trends in Renewable Energy Sources
- Organized By: Electrical Dept. Government Polytechnic, Nagpur Maharashtra.
- Date: 9 Jan 2018

10) Title: Solar Power System

- Institute: Government I.T I. College, Amravati
- Date: 22 to 23 Jan 2004

11) Title: Solar Power and Biogas

- Date: 10 Feb 2006
- Name of Seminar: Energy Conservation
- Organized by: P.W.D. Electrical Division Amravati

12) Title: Rooftop Solar Power Plant Design and Installation

- Date: 24 Jan 2019
- Organized by: Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra.

13) Title: Applications of Solar Photovoltaic Energy Systems Practical on Solar Cell

- Date: 02 Jan 2019
- Name of Workshop: Capacity Building and Skill Development in Renewable Energy
- Organised by: Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra.

14) Title: Rooftop Solar Power Plant – Design and Installation

- Date: 24 Jan, 2019
- Name of Workshop: Skill Development and Entrepreneurship Development In Solar Energy
- Organized by: Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra.

15) Title: Self- employment opportunities in renewable energy

- Date: 15 Sept 2018
- Name of workshop: Employment Generation Opportunities in Renewable Energy- A Scope in Agricultural Education System
- Organized By: Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola ,Maharashtra.

16) Title: solar PV system

- Date: 02-03-2023
- Institute: Govt. ITI. Khamgaon

17) Title: Solar & Bio Gas

- Date: 16-3-2023 for N.S.S.

18) Title: solar PV system

- One day workshop
- Date: 29-12-2022
- Institute: S.S.G.M.C. Shegaon

19) Title: Solar Basics and Fabrication of PV Module

- One Week Hands-On Training Programme
- Date: 21-03-2022 to 26-03-2022
- Institute: Govt. ITI, Balapur and Shegaon

20) Title: Solar Basics and Design of Solar Power Plant

- One Week Hands-On Training Programme
- Date: 09-11-2021 to 16-11-2021
- Institute: Govt. ITI, Balapur

21) Title: Solar Basics and Design of Solar Power Plant

- One Week Hands-On Training Programme
- Date: 07-10-2021 to 14-10-2021
- Institute: Govt. ITI, Shegaon

22) Title: Solar Energy & Basic Design of Solar Power Plant

- One Week Hands-On Training Programme
- Date: 21 Jan 2021
- Institute: Govt. ITI, Sangrampur

23) Title: Solar Power Plant Basics and Business Development

- Date: 18 April 2019 to 2 May 2019
- Name of Workshop: Detail Study on Radiation, PV Cell, PV Module & Solar Power Plant ON Grid – OFF Grid.
- Organized by: Electrical Department of SSGMCE, Shegaon

24) Title: Detail Study on Radiation, PV Cell, PV Module & Solar Power Plant

- Date: 26 to 28 Feb 2018
- Name of Workshop: Solar Power Plant Basics and Business Development
- Organized by: Solar Research Centre, SGIARC, SSGMCE, Shegaon

25) Title: Solar Energy and Applications

- Date: 18 March 2017
- Name of Workshop: Solar Energy Club

- Organized by: Mechanical Dept. SSGMCE, Shegaon

26) Title: Solar Power System

- Date: 16 mar 2017
- Organized by: Government I.T.I. College, Shegaon

27) Title: Detail Study on Radiation, PV Cell, PV Module & Solar Power Plant

- Date: 01 to 04 Mar 2017
- Name of Workshop: Solar Power Plant Basics and Business Development
- Organized by: Solar Research Centre, SGIARC, SSGMCE, Shegaon

28) Title: Renewable Energy

- Date: 28 November 2015
- Organized by: SSGMCE, NSS Camp at Janori

29) Title: Renewable Energy Sources

- Date: 20 August 2014
- Name of Workshop: Renewable Energy Clubs
- Organized by: Mechanical Dept. SSGMCE, Shegaon

30) Title: Theory, Demonstration and hands on training

- Date: 07 To 09 May 2009
- Name of Workshop: Solar Power and Solar Electronics
- Organized by: Solar Research Centre, SGIARC ,Shegaon

31) Title: Theory, Demonstration and hands on training

- Date: 05 December 2008
- Name of Workshop: Training on Battery Maintenance
- Organized by: Department of Applied Science and Humanities Ssgmce, Shegaon

32) Title: Solar Power and Solar Electronics

- Date: 15-16 Sep 2006
- Institute: Shri Sant Gajanan College of Engg, Shegaon, Maharashtra

33) Tittle: Theory, Demonstration and hands on training

- Date: 15 to 16 Sept 2006
- Name of Workshop: Solar Power and Solar Electronics
- Organized by: Technology Transfer Programme (Ttp), At Ssgmce Shegaon

- **Patents: (Granted)**

- An Improved Lead Acid Battery For Solar Power System**

- Application – 2275/MUM/2007 A
    - Filing Date- 19-11-2007, Publication Date- 25-01-2008
    - Applicant: Gajanan Invention and Advance Research Centre
    - Inventor – Ajay Kumar Damral

- **Patents: (Filed)**

- A Solar Operable System for Cooking and Water Purification**

- Application – 202021001375
    - Filing Date- 13/01/2020
    - Inventor – Ajay Kumar Damral

- A Hybrid Solar Power System**

- Application – 202021032963
    - Filing Date – 31/07/2020
    - Inventor – Ajay kumar Damral, Dr. Anupama Deshpande, Dr. S. R. Paraskar

- Hybrid Solar Energy Storage Device (HSESD)**

- Application – 201621000237
    - Filing Date- 05/01/2016
    - Applicant: Gajanan Invention and Advance Research Centre
    - Inventor – Ajay Kumar Damral, Dr. Mohan Khedkar

- A Solar Based Alternating Current Generator & Booster**

- Application – 2273/MUM/2007 A
    - Filing Date- 19-11-2007, Publication Date- 25-01-2008
    - Applicant: Gajanan Invention and Advance Research Centre
    - Inventor – Ajay Kumar Damral

- An Improved Solar Powered Street Lighting System**

- Application – 416/MUM/2008 A
    - Filing Date- 29-02-2008, Publication Date- 04-04-2008
    - Applicant: Gajanan Invention and Advance Research Centre
    - Inventor – Ajay Kumar Damral

**A solar lantern with an improved power control circuit**

- Application – 1270/MUM/2009 A
- Filing Date- 20-05-2009, Publication Date- 12-06-200
- Applicant: Gajanan Invention and Advance Research Centre
- Inventor – Ajay Kumar Damral

### **Abroad Visits for R&D work :**

- 2008 visit to China for attending international fair for solar energy in Shanghai.
- 2009 visit to Germany for attending 24<sup>th</sup> European Photovoltaic Solar Energy Conference and Exhibition.
- 2012 (Mar. & Aug. ) visit to China for P.V. m/c purchasing & testing
- 2013 visit to China for attending the international fair.
- 2014 visit to Germany for attending international trade fair for industrial technology in Hannover Messe.
- 2015 visit to Germany for attending international trade fair for industrial technology in Hannover Messe.
- 2016 visit to Germany for attending international trade fair for industrial technology in Hannover Messe.
- 2018 visit to Singapore for Interaction with Electrical Dept. NTU Singapore
- 2019 visit to polytechnolgy collage Nagpur.
- 2021 visit to Solar Energy & Business Opportunity in renewable energy for Indian Army , Assam
- 2022 visit to Solar Energy & Business Opportunity in renewable energy for Indian Army , Assam
- 2022 visit to sunderbani.
- 2023 visit to bhawani mangla mata jammu.
- 2024 visit to BaBa Ghulam Shah Badshah University Rajuri Jammu & Kashmir

## **List of Solar Product**

- Solar Water Pumping (Kapil Dhara)-1
- Solar Tubular Battery 12v-40Ah
- Solar Electrolyte Type Tubular Battery 12v/40Ah
- Solar LED Based Solar Street Lighting Systems
- Solar Home Lighting System Module-1
- Solar Home Lighting System Module-3
- Solar CFL Based Solar Street Lighting Systems
- Solar Home Lighting System
- Design And Development of Eco-friendly Solar Chula

### Instrument Details

SN	Section	Machine & Equipment
1	P.V. Cell Module Section	Solar Cell Testing Machine
		Solar Diode Pump Laser Scribing Cell Machine
		Solar Module Testing Machine
		Vacuum Laminator
		Curing Oven
		Thermo Cutter
2	Battery Section	Heat Sealing Machine
		Battery Charger
3	PCB Section	Etching Machine
		Hot Air Oven
		High Speed Drill Machine
		Brushing &Drying Machine
		Exposing Machine
		Quality Checking Table
		Tinning Machine
4	Fabrication Section	Welding Machine
		Drill Machine
		Small Drill Machine
		Pipe Cutter
		Manual Bending Machine
		Transformer Winding Machine



















## CELL TESTER

The equipment is used to test the solar cells IV characteristic's.



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## LASER CUTTING MACHINE

The equipment is used to cut the solar cells as per the design requirements.



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## EL TESTER

EL tester means electroluminescent inspection. Be used to check the solar panel of secluded split, cracked cell, rosin joint, wire break.



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