



Rayat Shikshan Sanstha's
Arts, Science and Commerce College, Mokhada
Dist. Palghar 401 604

Department of Mathematics
Short Term Course- USMS01 Certificate Course in
“Solar Photovoltaic System” by UGC-NSQF
Board of Studies – 2021-2022

Sr. No.	Designation	Name of the person
1	Chairman	Dr. L. D. Bhor (Principal)
2	Member	Prof. P. K. Patil (Head of Mathematics Department)
3	Member	Prof. V. B. Jagzap (Expert)
4	Member	Prof. P. K. Patil (Coordinator, Solar Photovoltaic System)
5	Member	Prof. P. K. Patil (Chairman, Short Term Course Committee)

Minutes of the Meeting

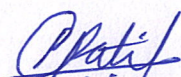
Board of Studies meeting of the Short Term Course / Certificate Course in Applied Mathematics & Statistical Techniques was conducted on 01-12-2021 at 02.30 pm in the Online Mode via Zoom App. Above members were present in the meeting.

Following Points are discussed in this meeting.

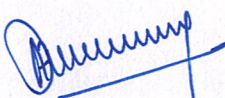
1. Syllabus formation of Solar Photovoltaic System
2. Dissemination of work
3. Fee structure
4. Encouragement of Student

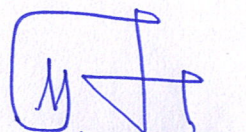
Place: ASC College, Mokhada

Date: 01/12/2021


Coordinator




IQAC
Coordinator


Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar

Rayat Shikshan Sanstha's
**Arts, Science and Commerce College Mokhada, Dist.
Palghar**

Department of Mathematics
Short term Course Solar Photovoltaic System
Notice

Date: 06/12/2021

All Students of T.Y.B.Sc Classes are hereby informed the department of Mathematics organizes a short term course of Certificate course in **Solar Photovoltaic System**. So, interested students contact to Pro. P. K. Patil till 15th December 2021 for the admission for these courses.



A handwritten signature in blue ink, appearing to read 'P. K. Patil'.

Course co-ordinator
Department of Mathematics

A handwritten signature in blue ink, appearing to be the signature of the Principal.

Principal
Arts, Science & Commerce, College
Mokhada, Dist. Palghar

Rayat shikshan Sanstha's

Arts, Science and Commerce College, Mokhada Dist-Palghar 401 604

Department of Mathematics

Short Term Course (NSQF) Solar Photovoltaic System

Timetable 2021-22

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
10:00 am - 11:00 am	Theory	Theory	-	-	-	-
2:00 pm - 04:00 pm	-	-	-	-	Practical	Practical

Platif

Course Co-ordinator



Platif

Head

Department of Mathematics

UJG

Principal

Arts, Science & Commerce, College
Mokhada, Dist. Palghar

Syllabus for Certificate course

In

Solar Photovoltaic Systems

Under the Scheme of

Skill Based Education under

UGC- National Skill Qualification Framework

Submitted

To

University of Mumbai, Mumbai

By

Rayat Shikshan Sanstha's,

Arts, Science & Commerce College, Mokhada

Taluka- Mokhada, Dist-Palghar, State- Maharashtra

Pin 401604

Ph. 02529-256628/256706

E-mail- asccmokhada@gmail.com

Website- www.asccmokhada.in





Syllabus for Certificate Course in Solar Photovoltaic Systems

1. Introduction:

Solar PV systems are used for electricity generation by using solar panels and sunlight. A photovoltaic system is composed of one or more solar panels combined with an inverter and other electrical and mechanical hardware that use energy from the sun to generate electricity. PV systems can vary greatly in size from small roof top or portable systems to massive utility scale generation plants. Although PV systems can operate by themselves as OFF-grid PV systems.

2. Rationale for introducing the course:

Solar Photovoltaic Systems course prepares candidates not just for a Job but a Career and leads them to become Industry oriented professional and entrepreneur. The course will help to give hands-on-expertise in the area of Solar PV OFF-grid systems and Solar PV ON-grid systems. Candidates are ready to opt for multiple roles in the field of solar energy.

3. Availability of relevant industry & Market survey undertaken in order to assess the feasibility:

Nasik is the growing town in the state. The MIDC, IT Industry, and SEZ are developing very fast in and around Nasik city. The Micro, Small, Medium Scale Industries and Public as well as Private Companies are increasing very fast hence the demand for electricity is increasing day by day. So, lots of opportunities are available for students for developing their own business in the area of power sector.

4. Potential for employment generation:

The Course is integrated with theoretical concepts, practical applications. After successfully completed this course, candidate can join any organization from solar energy sector. If somebody wants to work independently as a solar PV installer, it can give the person with nice opportunities in terms of earning great money.

5. Details about Structure\Pattern of Syllabus:

- **Title of the course** : Certificate Course in Solar Photovoltaic Systems
- **Duration of the Course** : One Semester
- **Name of the Faculty** : Arts, Science & Commerce
- **Compulsory Paper** : Five
- **Optional Paper** : Not Applicable



- **Medium of Instructions** : Marathi & English
- **Eligibility for admission** : Candidate should pass the higher secondary board or equivalent with English as one of the subject.
- **Intake Capacity** : 20 Students for the course
- **Course Level** : level-4
- The complete structure will be as follows.

❖ Certificate Course in Solar Photovoltaic Systems NSQF Level-4			
Course	General Education Component (Theory)	Credits	Total Marks
GEC-1	Components of Photovoltaic Systems	04	40
GEC-2	Solar Photovoltaic Systems: Design & Integration	04	40
GEC-3	Solar Photovoltaic Systems: Installation & Maintenance	04	40
Skill Development Component (Practical)			
SDC-1	Practical – I (Based on Theory)	12	120
SDC-2	Practical – II (Field Work)	06	60
Total		30	300

6. Pattern of Examination:

a) Evaluation:

Examination will be held at the end of the course as per UGC-NSQF guidelines.

b) Standard of passing: Minimum 40%.

c) Award of Class, Percentage & Degree: as per UGC-NSQF guidelines.

d) External Student: NA

7. Pattern of Question paper: as per UGC-NSQF guidelines.

8. Infrastructure Available:

a) ICT enabled Classroom.

b) Availability of laboratory.

9. Teaching Faculty:

Sr. No.	Name of the Faculty	Qualification	Experience
1	Prof. S. K. Vitnor	M.Sc	30 Years
2	Prof. S. A. Funde	M.Sc. SET	1 Year

10. Syllabus:



Course Code: GEC-1

Course Title: Components of Photovoltaic Systems

Unit I: Components of Grid – connected Solar PV Systems

Solar Modules , Charge Controllers, Inverters Batteries ,Racking ,Solar PV array , Array Combiner box, DC cabling , DC Distribution Box, Grid – Connected Inverter, AC Cabling , AC distribution Box .

Unit II: Components of Solar Panel

PVmodule,Side- of Pole Mount for solar panel , Midnight PV 3 combiner Box,C40 Charge controller, Deep cycle battery, Solectrica Inverter on a prewired Power panel .

Course Code: GEC-2

Course Title: Solar Photovoltaic Systems: Design & Integration

Unit I: Solar PV systems Design and integration

Types of Solar PV Systems, Standalone SPV system, Grid connected SPV systems, hybridSPV system, Design methodology for SPV systems, Approximate Design of standalone system,Solar PV System design chart , Look up table for PV system design.

Unit II: Design of solar cell

Upper limits of Cell Parameters, Losses in solar cells, Solar cell Design, Design of Isc, Design of Voc, Design of FF, Analytical techniques.

Unit III: PV systems design and its applications

Introduction of solar PV systems, Standalone PV systems configurations, Design methodology of PV systems ,Wire Sizing in PV systems , Precise sizing of PV systems, Hybrid PV systems, Grid connected PV systems ,simple Payback Period, Lifecycle costing.

Course Code: GEC-3

Course Title: Solar Photovoltaic Systems: Installation & Maintenance

Unit I: Installation, Troubleshooting and safety

Summary of PV system components, Summary of types of solar PV systems,Installation and troubleshooting of standalone solar PV systems, safety in installation of Solar PV systems, Installation and troubleshooting Of solar PV Power Plants, Solar PV plant installation Check list.

Unit II: Maintenance of PV systems

Course Code: SDC-1

Course Title: Practical Based on Theory

- i. Testing of Solar PV Panel
- ii. Study of Digital Multimeter
- iii. Study of Solar Panels connected in series and parallel
- iv. To Show the effect of variation in tilt angle on PV module power
- v. Study of Solar Cell characteristics
- vi. To vary Intensity & measures current and voltage


- vii. To demonstrate the I-V and P-V characteristics of PV module with varying radiation and temperature level
- viii. To demonstrate the I-V and P-V characteristics of series and parallel combination of PV modules
- ix. To demonstrate the effect of shading on module output power
 - x. Workout power flow calculations of standalone PV system of AC load with battery.
 - xi. Workout power flow calculations of standalone PV system of DC load with battery.
- xii. Find the MPP manually by varying the resistive load across the PV panel.

Course Code: SDC-2

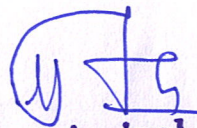
Course Title: Field Work

References:

1. Solar Energy Utilisation: G. D. Rai, Khanna Publishers
2. Solar Energy: fundamentals and applications, Garg & Prakash, H. P. Garg, Tata McGraw Hill Education, 2000.
3. Solar Photovoltaics: Fundamentals, Technologies and Applications, Solanki Chetan Singh, Eastern economy Edition.
4. Sustainable Energy: Richard A Dunlap, CENGAGE Learning.
5. Sustainable Design and Development: Stribig, Ogundipe, Papadakis, CENGAGE Learning

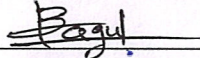
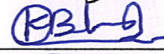

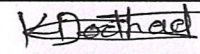
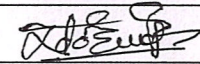
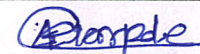

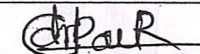
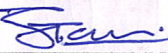
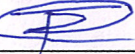
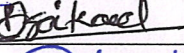


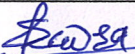
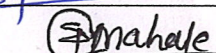

Course Co-ordinator

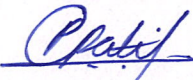




Principal
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Mokhada, Dist. Palghar

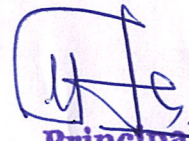
Rayat Shikshan Sanstha's
Arts, Science and Commerce College, Mokhada Dist. Palghar 401 604
Short Term Course 2021-22
Certificate course in "Solar Photovoltaic System" under UGC-NSQF
Student List

Class : T.Y.B.Sc.

Sr. No.	Roll Number	Name of the Student	Signature
1	9032/21	Bagul Akash Keshev	
2	9033/21	Bhavari Kiran Pandurang	
3	9034/21	Chaudhari Tushar Narayan	
4	9035/21	Dodhad Kriti Bhavesh	
5	9036/21	Dodhad Ramesh Ananta	
6	9037/21	Harpale Aditya Rajesh	
7	9038/21	Kharpade Sapna Lahu	-
8	9039/21	Padir Jayesh Narendra	
9	9040/21	Pawar Devyani Madhukar	
10	9015/21	Aher Ganesh Shivram	
11	9016/21	Chothe Trupti Rajendra	
12	9017/21	Gaikwad Dipak Govind	
13	9018/21	Gode Rajesh Sampat	
14	9019/21	Hilim Ravindra Sanjay	
15	9020/21	Kurva Sanjay Bhau	
16	9021/21	Mahale Sunil Popat	


Co-ordinator

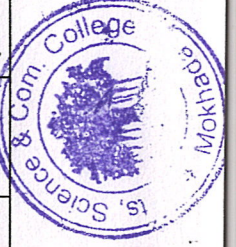

Head
Department of Mathematics


Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar



Sr. No.	Roll No.	Name of Students	Date													
			20/10/21	21/10/21	27/10/21	29/10/21	4/11/21	7/11/21	10/11/21	11/11/21	17/11/21	18/11/21				
1.	9032/21	Bagul Akash Keshev	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul
2.	9033/21	Bhavari Kiran Pandurang	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi	Bhavi
3.	9034/21	Chaudhari Tushar Narayan	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar	Tushar
4.	9035/21	Dodhad Kriti Bhavesh	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad
5.	9036/21	Dodhad Ramesh Ananta	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad	Dodhad
6.	9037/21	Harpale Aditya Rajesh	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale	Harpale
7.	9038/21	Kharpade Sapna Lahu	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade	Kharpade
8.	9039/21	Padir Jayesh Narendra	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir	Padir
9.	9040/21	Pawar Devyani Madhukar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar	Pawar
10.	9015/21	Aher Ganes Shivram	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher	Aher
11.	9016/21	Chothe Trupti Rajendra	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe	Chothe
12.	9017/21	Gaikwad Dipak Govind	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad	Gaikwad
13.	9018/21	Gode Rajesh Sampat	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode	Gode
14.	9019/21	Hilim Ravindra Sanjay	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim	Hilim
15.	9020/21	Kurva Sanjay Bhau	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva	Kurva
16.	9021/21	Mahale Sunil Popat	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale	Mahale

Course Coordinator

Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar

Head of Department

Mr. Funde S.A. Pract. 2

Rayat Shikshan Sanstha's

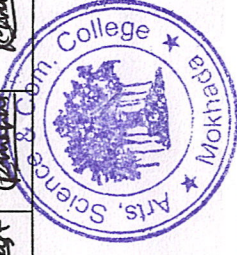
Arts, Science & Commerce College Mokhada, Tal. Mokhada, Dist. Palghar 401 604.
Certificate Course in "Solar Photovoltaic System" under UGC-NSQF

Attendance Sheet 2021-2022

Sr. No.	Roll No.	Name of Students	11/10/22	17/10/22	18/10/22	21/10/22	24/10/22	Date
1.	9032/21	Bagul Akash Keshav	Bagul	Bagul	Bagul	Bagul	Bagul	
2.	9033/21	Bhavari Kiran Pandurang	BB	BB	BB	BB	BB	
3.	9034/21	Chaudhari Tushar Narayan	TD	TD	TD	TD	TD	
4.	9035/21	Dodhad Kriti Bhavesh	DD	DD	DD	DD	DD	
5.	9036/21	Dodhad Ramesh Ananta	DR	DR	DR	DR	DR	
6.	9037/21	Harpale Aditya Rajesh	HP	HP	HP	HP	HP	
7.	9038/21	Kharpade Sapna Lahu						
8.	9039/21	Padir Jayesh Narendra	PD	PD	PD	PD	PD	
9.	9040/21	Pawar Devyani Madhukar	PD	PD	PD	PD	PD	
10.	9015/21	Aher Ganesh Shivram	AG	AG	AG	AG	AG	
11.	9016/21	Chothe Trupti Rajendra	CT	CT	CT	CT	CT	
12.	9017/21	Gaikwad Dipak Govind	GD	GD	GD	GD	GD	
13.	9018/21	Gode Rajesh Sampat	GR	GR	GR	GR	GR	
14.	9019/21	Hilim Ravindra Sanjay	HR	HR	HR	HR	HR	
15.	9020/21	Kurva Sanjay Bhau	KR	KR	KR	KR	KR	
16.	9021/21	Mahale Sunil Popat	MP	MP	MP	MP	MP	

Funde S.A.

Course Coordinator



Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar

Head of Department

Mr. Vitnor S.K. Theew 04

Sr. No.	Roll No.	Name of Students	Date													
			18/10/21	19/10/21	20/10/21	21/10/21	22/10/21	23/10/21	24/10/21	25/10/21	26/10/21	27/10/21	28/10/21			
1.	9032/21	Bagul Akash Keshev	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul
2.	9033/21	Bhavari Kiran Pandurang	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli	BBli
3.	9034/21	Chaudhari Tushar Narayan	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.	Chau.
4.	9035/21	Dodhad Kriti Bhavesh	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad
5.	9036/21	Dodhad Ramesh Ananta	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad	DDhad
6.	9037/21	Harpale Aditya Rajesh	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale	HPale
7.	9038/21	Kharpade Sapna Lahu														
8.	9039/21	Padir Jayesh Narendra	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir	PDir
9.	9040/21	Pawar Devyani Madhukar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar	PDar
10.	9015/21	Aher Ganesh Shivram	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur	SPur
11.	9016/21	Chothe Trupti Rajendra	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe	CPhe
12.	9017/21	Gaikwad Dipak Govind	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad	GPkwad
13.	9018/21	Gode Rajesh Sampat	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode	GDode
14.	9019/21	Hilim Ravindra Sanjay	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim	HSilim
15.	9020/21	Kurva Sanjay Bhau	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva	KSurva
16.	9021/21	Mahale Sunil Popat	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale	MSuhale

Course Coordinator



Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar

Head of Department

Mr. Funder S.A.

Th. Pract
8 + 2 =

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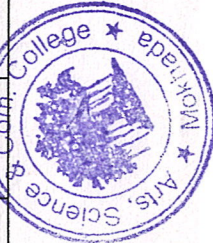
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Sr. No.	Roll No.	Name of Students	Date													
			01/03/22	04/03/22	07/03/22	08/03/22	11/03/22	12/03/22	14/03/22	18/03/22	21/03/22	22/03/22	25/03/22	28/03/22		
1.	9032/21	Bagul Akash Keshev	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul	Bagul
2.	9033/21	Bhavari Kiran Pandurang	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
3.	9034/21	Chaudhari Tushar Narayan	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
4.	9035/21	Dodhad Kriti Bhavesh	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
5.	9036/21	Dodhad Ramesh Ananta	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
6.	9037/21	Harpale Aditya Rajesh	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
7.	9038/21	Kharpade Sapna Lahu														
8.	9039/21	Padir Jayesh Narendra	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
9.	9040/21	Pawar Devyani Madhukar	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
10.	9015/21	Aher Ganesh Shivram	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
11.	9016/21	Chothe Trupti Rajendra	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
12.	9017/21	Gaikwad Dipak Govind	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
13.	9018/21	Gode Rajesh Sampat	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
14.	9019/21	Hilim Ravindra Sanjay	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
15.	9020/21	Kurva Sanjay Bhau	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin
16.	9021/21	Mahale Sumil Popat	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin	Prin

Course Coordinator

Funder S.A.

Funder S.A.



Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar

Head of Department



Certificate Course in "Solar Photovoltaic System" under UGC-NSQF

N. B.: 1) Read all questions

Name: Bejgul Akash Keshav

Date: _____

Roll no.: 3032

Q.1 Multiple Choice Questions.

(30)

- 1) Most widely used solar material is.....
A. Arsenic
 C. Silicon
B. Cadmium
D. Steel
- 2) Photovoltaic cell or solar cell converts.....
A. Thermal energy into electricity
B. Electromagnetic radiation directly into electricity
C. Solar radiation into thermal energy
 D. Solar radiation into kinetic energy
- 3)is one of the most important materials is also known as solar grade silicon.
A. Crushed silicon
C. Powdered silicon
 B. Crystalline silicon
D. Silicon
- 4) A module in a solar panel refers to
A. Series arrangement of solar cells.
 C. Series and parallel arrangement of solar cells.
B. Parallel arrangement of solar cells.
D. None of the above.
- 5) The efficiency of the solar cell is about
A. 25 %
C. 40 %
 B. 15 %
D. 60 %
- 6) Batteries used for electrical energy storage are
A. Laclanche cells
 C. Lead acid cells
B. Edison cells
D. Any of the above
- 7) Solar cells are made from bulk materials that are cut into wafer of _____ thickness.
A. 120-180 μ m
C. 180-220 μ m
B. 120-220 μ m
 D. 180-240 μ m
- 8) Satellite power requirement is provided through
 A. Solar cells
C. Nickel cadmium cells
B. Dry cells
D. Lead acid batteries
- 9) The capacity of a battery is expressed in terms of
A. Current rating
 C. Ampere hour rating
B. Voltage rating
D. None of the above
- 10) On over charging a battery
A. It will bring about chemical change in active materials
B. It will increase the capacity of the battery
C. It will raise the specific gravity of the electrolyte
 D. None of the above



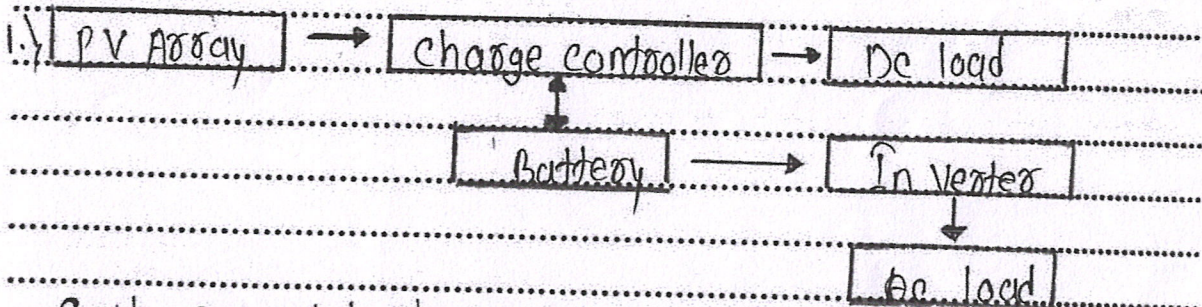
- 11) Battery charging equipment is generally installed
A. In well ventilated location
B. In clean and dry place
C. As near as practical to the battery being charged
 D. In location having all above features
- 12) To prevent local action in battery, only is used in electrolytes
A. Pump water
C. Tap water
 B. Distilled water
D. Both A and C
- 13) Which of the following battery is used for aircraft?
A. Lead acid battery
C. Dry cell battery
 B. Nickel-iron battery
D. Silver oxide battery
- 14) The current density of a photo voltaic cell ranges from
A. 10 - 20 mA/cm²
C. 20 - 40 mA/cm²
 B. 40 - 50 mA/cm²
D. 60 - 100 mA/cm²
- 15) A _____ system is used to produce electricity by using the sunlight through photovoltaic effect.
A. Solar power generation
C. Seebeck
 B. Photoelectric
D. Thomson

Q.2 Attempt any two Questions

(20)

1. Explain with block diagram On Grid Photovoltaic system.
2. With the help of block diagram, explain Off Grid photovoltaic system.
3. Explain with the help of block diagram Hybrid Photovoltaic system.

Answers



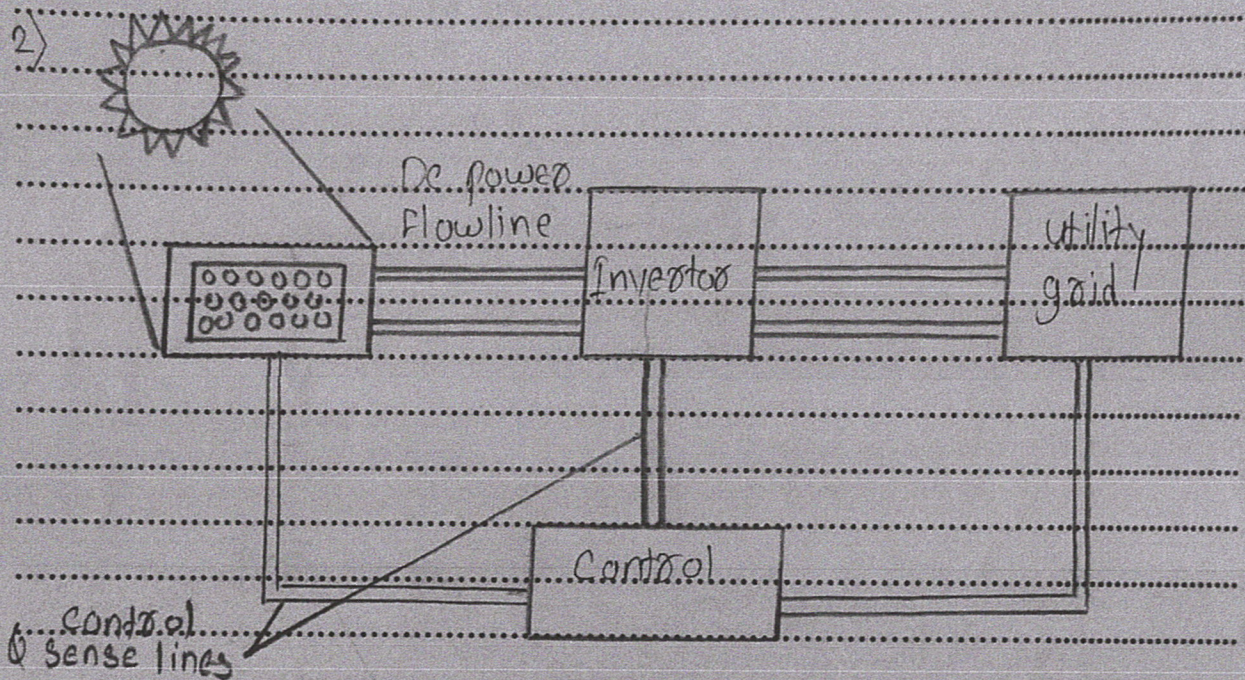
Grid-connected photovoltaic system -

A grid-connected photovoltaic system or grid-connected PV system is an electricity generating solar PV power system that is connected to the utility grid -

operation - Residential grid-connected rooftop system which have a capacity more than 10 kilowatts can meet the load of most consumers.

Photovoltaic wattage may be less than average consumption, in which case the consumer will continue to purchase grid energy but a lesser amount than previously.

Features - Electric power from photovoltaic panels must be converted to alternating current by a power inverter if it is intended for delivery to a power grid. The inverter sits between the solar array and grid and may be a large stand-alone unit or may be a collecting of small inverters attached to individual solar panels as an AC module.



All solar power systems work on the same basic principles. solar panels first convert solar energy or sunlight into DC power using what is known as the photovoltaic (PV) effect. The DC power can then be stored in a battery or converted by a solar inverter into AC power which can be used to run home appliances.

off-grid also known as stand-alone power system.

solar panels can generate energy during cloudy and overcast weather, but the amount of energy depends on the thickness and height of the clouds. off-grid solar system require specialised off-grid inverters and battery system large enough to store energy for 2 or more days. Hybrid-grid:


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Short Term Course 2021-22
Certificate course in "Solar Photovoltaic System" under UGC-NSQF
Mark sheet

Class: T. Y. B. Sc.

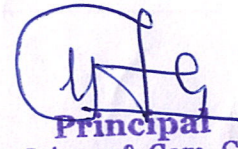
Sr. No.	Roll Number	Name of the Student	Marks obtained		
			Theory	Practical	Total
1	9032/21	Bagul Akash Keshev	38	26	64
2	9033/21	Bhavari Kiran Pandurang	40	27	67
3	9034/21	Chaudhari Tushar Narayan	35	25	60
4	9035/21	Dodhad Kriti Bhavesh	42	28	70
5	9036/21	Dodhad Ramesh Ananta	36	24	60
6	9037/21	Harpale Aditya Rajesh	37	26	63
7	9038/21	Kharpade Sapna Lahu	AB	AB	AB
8	9039/21	Padir Jayesh Narendra	38	28	66
9	9040/21	Pawar Devyani Madhukar	36	25	61
10	9015/21	Aher Ganesh Shivram	34	26	60
11	9016/21	Chothe Trupti Rajendra	36	26	62
12	9017/21	Gaikwad Dipak Govind	37	26	63
13	9018/21	Gode Rajesh Sampat	32	22	54
14	9019/21	Hilim Ravindra Sanjay	35	26	61
15	9020/21	Kurva Sanjay Bhau	36	27	63
16	9021/21	Mahale Sunil Popat	33	25	58



Course Coordinator



Head of the Department



Principal
Arts, Science & Com. College
Mokhada, Dist. Palghar



Rayat Shikshan Sanstha's
Arts, Science and Commerce College Mokhada, Dist. Palghar
Department of Mathematics
Short term Course Solar Photovoltaic System

Report 2021-22

The short-term course entitled “**Solar Photovoltaic System**” was carried out by department of Mathematics. Total 16 students were enrolled this course. During these course various techniques related to solar photovoltaic system were taught to the students. Total 15 students have successfully completed this course.



A handwritten signature in blue ink, appearing to read "P. Patil".

Head,
Department of Mathematics

A handwritten signature in blue ink, appearing to read "M. D. Patil".

Principal
Arts, Science & Commerce, College
Mokhada, Dist. Palghar