CSIR - CENTRAL BUILDING RESEARCH INSTITUTE
ROORKEE – 247 667 (UTTARAKHAND) INDIA

Registration No. : 0046/CBRI (STM)/2020-21

TO WHOM IT MAY CONCERN

Certified that **Ms. Khushi Garg**, student of B.Tech. (Electrical & Electronics Engg.), Banasthali Vidyapith, Rajasthan, completed her Training from 1st January, 2021 to 30th June, 2021 at this Institute.

During this period she worked on "Controlling of temperature and study of humidity control and ultraviolet dosage for disinfection of pathogens in air handling units of buildings" under the supervision of Dr. Nagesh Babu Balam, Sr. Scientist, AIMS Group, CSIR-Central Building Research Institute, Roorkee

She has been found sincere and hardworking during the training period.

(Nadeem Ahmad)
Senior Principal Scientist & Training Coordinator

Date : 02.07.2021

Nadeem Ahmad
Senior Principal Scientist & Group Leader
Student Training & Mentoring Group
CSIR-Central Building Research Institute
Roorkee-247 667 (Uttarakhand)

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

(Min. of Defence, DRDO)

Lucknow Road, Timarpur, Delhi-110054

File No. 1805/29/HR/SSPL/2021

Dated 15-07-2021

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that Mr./Ms./ MUSKAN MOTWANI

Student of B.TECH (EEE), BANASTHALI VIDYAPITH Roll No. 2017/1064

Branch B.TECH (EEE) has completed successfully Summer/Winter Internship for the period from 1st JAN 2021 to 30th JUNE 2021 Duration SIX(06) weeks / months.

Topic of Internship was MICROWAVE CIRCUIT DESIGN

During the training period his/her conduct at SSPL was good.

Head-HR

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: 5659

This is to certify that Surabhi Sharma

of Banasthali Vidyapith

successfully completed Internship

on PLC & SCADA

During 01st Jan 21 to 17th June 21.

All the best.

Training Director
Seldom India

SELDOM INDIA JAIPUR

Subsidiary of

SUN COMPUTECH

MOGU ENGINEERS

UAN RJ17D0087475

CHANNEL PARTNER OF

ABB | WIPRO Applying Thought | Fuji Electric | YASKAWA | HAVELLS

For Certificate Authenticity please contact us at CIC@SeldomIndia.com

Jaipur :
27, Kailash Puri, Near Khandaka Hospital, Tonk Road,
Jaipur, Rajasthan-302018 Phone : +91-9413 240 301

Delhi :
K-108/109, Street #2, Mangal Bazar, Laxmi Nagar, Delhi-110091
Phone : +91-11-22015681, 22425681, 9911335681

www.seldomindia.com
cic@seldomindia.com
info.seldomindia@google.com
+91 9413 240 301
seldomindia
@SeldomIndia

CSIR - CENTRAL BUILDING RESEARCH INSTITUTE
ROORKEE – 247 667 (UTTARAKHAND) INDIA

Registration No. : 0045/CBRI (STM)/2020-21

TO WHOM IT MAY CONCERN

Certified that **Ms. Vanshita Sharma**, student of B.Tech. (Electrical & Electronics Engg.), Banasthali Vidyapith, Rajasthan, completed her Training from 1st January, 2021 to 30th June, 2021 at this Institute.

During this period she worked on "Controlling of humidity and study of temperature control and ultraviolet dosage for disinfection of pathogens in air handling units of buildings" under the supervision of Dr. Nagesh Babu Balam, Sr. Scientist, AIMS Group, CSIR-Central Building Research Institute, Roorkee

She has been found sincere and hardworking during the training period.

(Nadeem Ahmad)
Senior Principal Scientist & Training Coordinator

Nadeem Ahmad
Senior Principal Scientist & Group Leader
Student Training & Mentoring Group
CSIR-Central Building Research Institute
Roorkee-247 667 (Uttarakhand)

Date : 02.07.2021

No. D. 2355/dt. 04/11/20

K. C. KASLIWAL THERMAL TRAINING INSTITUTE

Rajasthan Rajya Vidyut Utpadan Nigam Ltd.

Kota Super Thermal Power Station, Kota - 324008

CERTIFICATE

This is to Certify that Mr./ Miss ...Aakanksha....Mohendale..... Student of Class B.Tech. IV th year (EEE) of Banasthali Vidyapith..... has undergone Practical Training at Kota Super Thermal Power Station, Kota w.e.f. 01st Jan.'2021 to 31st May'2021 in various fields of this Power Station. His/ Her Performance during training Period is found Satisfactory.

Kota.
Date : 16-06-2021

Course Co-Ordinator
KSTPS, RRVUNL, Kota.

Printed by : Tirupati Offset Printers Pvt. Ltd., 234 Shopping Center Kota. Ph. 2360020

Sahasra Sambhav Skill Development Pvt. Ltd.
A-4, Phase-II Noida-201305, U.P.
E-mail : skill@sahasraelectronics.com, website : www.sahasraelectronics.com

Reg. No.: - SSSDPL/2020-21/ANC1305F/011 **Date- 24th June. 2021**

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Aanchal Gera (Aadhaar No. 499970443685)**, D/O Mr. Manoj Gera has taken training in our group company **Sahasra Electronics Pvt. Ltd., Noida** from the period 11th Jan. 2021 to 31st May 2021

During her tenure here, she received training on PCB Designing & Manufacturing, Advance EMS (PCB Assembly & SMT), Basics of LED Lighting, Basics of Solar Technology & QMS.

Her conduct during the period was very good and found her hardworking and dedicated.

We wish her success and blessings for her future Career.

Sahasra Sambhav Skill Development Pvt. Ltd. A-4 Phase-II Noida 201305

Authorized Signatory
Sahasra Sambhav Skill Development Pvt. Ltd.

FARELABS
FOOD ANALYSIS & RESEARCH LABORATORY
TESTING, CALIBRATION, PROFICIENCY TESTING, R&D & TRAINING SERVICES

FARE LABS Private Limited
L-17/3, DLF Phase-II, IFFCO Chowk, M.G. Road,
Gurgaon-122002, Haryana, INDIA
Phone : +91-124-4223207, 4034205
Fax : +91-124-4036038, Cell : +91-95992 21227
E-mail : farelabs@farelabs.com
Website : www.farelabs.com

18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Ambika Rana,** D/o Mr. J.S. Rana from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Measurement"** from 4th January 2021 to 18th June 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Sweta Shalini,** D/o Mr. Arun Kumar Mandal from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Measurements"** from 4th January 2021 to 26th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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E-mail : farelabs@farelabs.com
Website : www.farelabs.com

18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Aditi Anand,** D/o Mr. Mithilesh Prasad from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Measurements"** from 4th January 2021 to 26th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

CERTIFICATE OF COMPLETION

Presented to

Aditi Anand

For successfully completing a free online course

Python Fundamentals for Beginners

Provided by

Great Learning Academy

(On June 2021)

CERTIFICATE OF COMPLETION

Presented to

Aditi Anand

For successfully completing a free online course

C for Beginners

Provided by

Great Learning Academy

(On June 2021)

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Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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Human Resource Department

Dr. Meenakshi Tripathi
President

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Human Resource Department

Dr. Meenakshi Tripathi
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Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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Girija S. Giri
Human Resource Department

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Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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C for Beginners

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Great Learning Academy

(On June 2021)

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805-108/HR/SSPL 2021
Dated 18/06/2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that Mr./Ms./ Anchal JHA

Student of BANASTHALI VIDYAPITH, RAJASTHAN Roll No. 1712760/EEE

Branch B.Tech (EEE) has completed successfully Summer/Winter Internship for the period from 11-01-21 to 3-06-21 Duration (19) Nineteen weeks/months.

Topic of Internship was Acquire Data from Sensors using PXI Based DAQ system using LabVIEW Application Software

During the training period his/her conduct at SSPL was good.

Kapil Kumar Jain

KAPIL KUMAR JAIN
Scientist 'G'
Group Dir. - HR
Solidstate Physics Laboratory
Lucknow Road, Delhi-110054
Head-HR

यू.आर.राव उपग्रह केंद्र
अंतरिक्ष विभाग
भारत सरकार
विमानपुर पोस्ट
बेंगलूरु - 560 017

इसरो ISRO
Indian Space Research Organisation

U. R. Rao Satellite Centre
Department of Space
Government of India
Vimanapura Post
Bengaluru - 560 017

Certificate

DATE : 16-06-2021

This is to certify that Ms. Anika Shrivastava
of Banasthali Vidyapith, Rajasthan *has undergone*
Project training in System Engineering - Controls and Communication Group *at this Centre*
during the period from 11/01/2021 to 03/06/2021.

COURSE	:	B.Tech (Electrical & Electronics)
PROJECT TITLE	:	Auto TM PROM Data Verification and Error Detection
PROJECT MEMBERS	:	1. Mitanshi Kulshrestha 2. Preksha Tiwari 3. Nisha
PERFORMANCE	:	Excellent

(Basavaraj.S Akkimaradi)
Group Director PPEG, URSC

Sahasra Sambhav Skill Development Pvt. Ltd.
A-4, Phase-II Noida-201305, U.P.
E-mail : skill@sahasraelectronics.com, website : www.sahasraelectronics.com

Reg. No.: - SSSDPL/2020-21/ANS0605F/014 **Date- 24th June. 2021**

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Anshima Pandey (Aadhaar No. 222661806110)**, D/O Mr. Anil Kumar Pandey has taken training in our group company **Sahasra Electronics Pvt. Ltd., Noida** from the period 11th Jan. 2021 to 31st May 2021

During her tenure here, she received training on PCB Designing & Manufacturing, Advance EMS (PCB Assembly & SMT), Basics of LED Lighting, Basics of Solar Technology & QMS.

Her conduct during the period was very good and found her hardworking and dedicated.

We wish her success and blessings for her future Career.

Sahasra Sambhav Skill Development Pvt. Ltd. A-4 Phase-II Noida 201305

Authorized Signatory
Sahasra Sambhav Skill Development Pvt. Ltd.

ADITYA BIRLA

UltraTech

UTCL/KCW/HRD/2021-22

10th June 2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Anuja Pathak** student of Banasthali Vidyapith, Electrical & Electronics Engineering has undergone a practical training for the period of **05 months** from **07th Jan' 2021 to 31st May' 2021** in **Electrical & Instrumentation Department** with project title **"Plant Overview and Working of AC Motor".**

During the above period, she has shown keen interest in completion of project.

We wish her all success in his future endeavors.

For **UltraTech Cement Limited**
(Unit: Kotputli Cement Works)

Sunit Kumar Saxena
General Manager – Human Resource

UltraTech CEMENT
The Engineer's Choice

UltraTech Cement Ltd.
(Unit : Kotputli Cement Works)

FACTORY : Village : Mohanpura, Tehsil : Kotputli, Distt.: Jaipur – 303 108, Tel / Fax : 0141 - 2378980
JAIPUR OFFICE : Office No. 1, 3rd Floor, Sanghi Upasna Tower, Near Ahinsa Circle C-98, Subhash Marg, C-Scheme, Jaipur-302001 (Raj.) Tel. : 0141 - 2378979/80/81
REGISTERED OFFICE : UltraTech Cement Ltd., 'B' Wing, Second Floor, Ahura Centre, Mahakali Caves Road, Andheri (East), Mumbai-400 093
CIN No. : L26940MH2000PLC128420

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
सीएसआईआर - राष्ट्रीय विज्ञान, प्रौद्योगिकी और विकास अध्ययन संस्थान
पूसा गेट, डा० के० एस० कृष्णन् मार्ग, नई दिल्ली-110012
CSIR - NATIONAL INSTITUTE OF SCIENCE, TECHNOLOGY AND DEVELOPMENT STUDIES
Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 09.06.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Anushruti Kumari, a student of B. Tech. (Electrical and Electronics VII Semester)) from School of Automation Banasthali Vidyapith, Banasthali has successfully completed 8th-semester internship from Jan. 2021 to June 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "FORECASTING AIR QUALITY IN DELHI BY USING MACHINE LEARNING", which involved her to research in various aspects.

She has successfully completed her training. During the time of her internship program with us she was found hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

Authorized Signature.
for (Head, PME)

Head PME
National Institute of Science
Technology & Developmewnt Studies
Dr. K. S. Krishnan Marg, Pusa, N. Delhi-12

Tel. : +11-25846064, 25843227, 25841630, 25843387, 25846445, 25849386
Fax : +11-25846640, 25841260 Website : http://www.nistads.res.in

Cert. No :- CRISP/20/2793/ONL06/00692 Reg. ID : - 2020/JSEEIEPOL/01/3

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Aparna Chourey, D/o Mr. Nawal Kishore Chourey

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Subrato Howlader
Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
सीएसआईआर - राष्ट्रीय विज्ञान, प्रौद्योगिकी और विकास अध्ययन संस्थान (निस्टैड्स)
पूसा गेट, डा० के० एस० कृष्णन मार्ग, नई दिल्ली-110022
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH
CSIR - NATIONAL INSTITUTE OF SCIENCE, TECHNOLOGY AND DEVELOPMENT STUDIES (NISTADS)
Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 02.06.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Apoorva Srivastava, a student of B. Tech. (Electrical and Electronics, VII Semester) from School of Automation Banasthali Vidyapith, Banasthali has successfully completed training from Jan. 2021 to June 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "SOCIO-ECONOMIC IMPACT ASSESSMENT OF FOOD TECHNOLOGIES DEVELOPED BY CSIR". Which involved her to research in various aspects.

She has successful completed her training. During the time of her internship program with us she was found punctual, hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

02/06/2021

Supervisor Signature
(L. Pulamte)

CSIR-NISTADS

Authorized Signature.

Head PME
National Institute of Science
Technology & Developmewnt Studies
Dr. K. S. Krishnan Marg, Pusa, N. Delhi-12

Tel. : +11-25846064, 25843227, 25841630, 25843387, 25846445, 25849386
Fax : +11-25846640, 25841260, Website : http://www.nistads.res.in

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805..28../HR/SSPL /2021
Dated ...06-07-2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that Mr./Ms./ ARPITA KOTARYA

Student of Banasthali Vidyapith, Rajasthan Roll No.

Branch B.Tech. (EE) has completed successfully Summer/Winter Internship for the period from 01 Jan 2021 to 30 Jun 2021 Duration (06) Six weeks / months.

Topic of Internship was Surface Acoustic wave sensor

During the training period his/her conduct at SSPL was good.

Sushil Singh
Head-HR

Important Instructions:

Cert. No :- CRISP/21/1051/ONL06/00696 Reg. ID : - 2021/JSEEIIAOL/02/10

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Ashiwini Pathak, D/o Mr. Umesh Kumar

in recognition of his/her participation in Online

"Internship on Industrial Automation"

Conducted on/during 06-01-2021 to 25-06-2021

PIYUSH JAIN

Course Co-ordinator **Chief Executive Officer**

Issue Date :-25-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

CETPA INFOTECH PRIVATE LIMITED

(An ISO 9001:2015 Certified Company)

Certificate of Training

This is to certify that

Anushka Sharma

has successfully completed Six Months Winter Training on
"Data Analytics using Python"
from 10 February to 10 August, 2021
at CETPA INFOTECH PVT. LTD., Noida.

Vikas Kalra
Director

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Because Knowledge Matters
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Anil Kumar Singh
Director-Training

Verify this Certificate by Registration Number **EWData10220213M7739589** **at http://www.cetpainfotech.com**

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FARE LABS Private Limited
L-17/3, DLF Phase-II, IFFCO Chowk, M.G. Road,
Gurgaon-122002, Haryana, INDIA
Phone : +91-124-4223207, 4034205
Fax : +91-124-4036038, Cell : +91-95992 21227
E-mail : farelabs@farelabs.com
Website : www.farelabs.com

18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Somya Sharma,** D/o Lt. Brajraj Sharma from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has completed her dissertation entitled **"Proficiency testing on calibration under ISO-17043"** from 4th January 2021 to 14th April 2021 at **FARE Labs Pvt. Ltd.**

We wish her best in her future endeavors!

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

कार्यालय प्रधानाचार्य / Office of the Principal
क्षेत्रीय दूरसंचार प्रशिक्षण केन्द्र / Regional Telecom Training Centre
(आईएसओ 9001:2008 का अंग/An ISO 9001:2008 Certd. Instt.)
सेक्टर 'जी', एलडीए कालोनी, कानपुर रोड, लखनऊ-226012
Sector-'G', LDA Colony, Kanpur Road, Lucknow-226012
दूरभाष/Tel. : 0522 - 2425585फैक्स/Fax : 0522 - 2425414

भारत संचार निगम लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT SANCHAR NIGAM LIMITED
(A Govt. of India Enterprise)

Date 23/06/21

To whom it may concern

This is to certify that the project entitled "**Optical Fiber Communication and Technology**" has been prepared by **Baruna Sarkar** a student from **Banasthali Vidyapith** at **REGIONAL TELECOM TRAINING CENTER (BSNL), Lucknow** from January 2021 to june 2021.

23/6/21

(Dharmender Kumar Rao)
Sub Divisional Engineer,
RTTC (BSNL), Lucknow

CERTIFICATE (Letter Head of the Organisation)

बिहार स्टेट हाइड्रोइलेक्ट्रिक पावर कॉरपोरेशन लि0
(बिहार सरकार का उपक्रम)
सोन पश्चिमी संयोजक नहर जल विद्युत परियोजना
डेहरी ऑन सोन (रोहतास) पीन कोड : 821307

फोन : 06184–54526 (कार्यालय)
06184–53321 (पावरहाउस)
फैक्स: 06184–52536.

To whom it may concern

This is to certify that Miss Ashruti Gupta, ID BTBTL17034 of B. Tech in Electrical and Electronics of Banasthali Vidyapith, Jaipur has done internship at Sone Western Link Canal H.E. Project Dehri-on-Sone, Rohtas, Bihar from 02.02.2021 to 02.06.2021.

She is hard working and punctual to her work.

I wish her all success in her life.

25/6/21

(Project Incharge)
S.W.L. Canal H.E.P. Dehri

पंजीकृत कार्यालय सोन भवन, वीरचन्द पटेल मार्ग, पटना 800 001
ई.पी.ए.बी.एक्स. दूरभाष संख्या 0612–224002 / 228267 फैक्स : 0612–227692
ई. मेल bshpc@bih-nic.in वेबसाईट : www.bshpcltd.com

विद्युत अभियांत्रिकी विभाग
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय)
वाराणसी
DEPARTMENT OF ELECTRICAL ENGINEERING
Indian Institute of Technology (Banaras Hindu University) Varanasi

Rakesh Kumar Misra, Professor

राकेश कुमार मिश्र, आचार्य

To whom it may concern

This is to certify that **Ms. Dipti Vats** (Roll No. **BTBTL17067**) a student of B. Tech., Electrical and Electronics Engineering, Banasthali Vidyapeeth, Tonk, Rajasthan worked on her final year project entitled "**Wireless sensor network optimization using computational intelligence**" under my supervision during 1 January 2021 to 15 June 2021.

Her performance in the project was very good. I wish her all the success in her future endeavours.

20 June 2021

Rakesh Kumar Misra / राकेश कुमार मिश्र

Professor, Department of Electrical Engineering / आचार्य, विद्युत् अभियांत्रिकी विभाग

IIT (BHU) Varanasi / भारतीय प्रौद्योगिक संस्थान (कशी हिन्दू विश्वविद्यालय) वाराणसी

Varanasi, Uttar Pradesh - 221005 INDIA / वाराणसी , उत्तर प्रदेश - 221005 भारत

rkmisra.eee@iitbhu.ac.in

Mobile Number / दूरभाष संपर्क : +91-9450-950-265

Cert. No :- CRISP/21/253/ONL06/00684 Reg. ID : - 2021/JSEEIEPOL/01/8

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Deep Shikha, D/o Mr. Dilip Kumar

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Subrato Howlader
Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

Cert. No :- CRISP/21/384/ONL06/00697 Reg. ID : - 2021/JSEEIIAOL/02/9

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Deepanshu Sheoran, D/o Mr. Krishan Kumar

in recognition of his/her participation in Online

"Internship on Industrial Automation"

Conducted on/during 06-01-2021 to 25-06-2021

PIYUSH JAIN

Course Co-ordinator **Chief Executive Officer**

Issue Date :-25-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

Cert. No :- CRISP/21/99/ONL06/00690 Reg. ID : - 2021/JSEEIEPOL/01/2

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Reema Patawa, D/o Mr. Ram Ji Patawa

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Course Co-ordinator **Chief Executive Officer**

Issue Date :-21-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

Cert. No :- CRISP/21/254/ONL06/00683 Reg. ID : - 2021/JSEEIEPOL/01/9

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Aprajita Singh, D/o Mr. Shashi Bhushan Singh

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Course Co-ordinator **Chief Executive Officer**

Issue Date :-21-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022,
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

Cert. No :- CRISP/21/38/ONL06/00691

Reg. ID :- 2021/JSEEIEPOL/01/1

CRISP

ISO 9001 : 2015

CENTRE FOR RESEARCH AND INDUSTRIAL STAFF PERFORMANCE

Certificate

This Certificate is awarded to

Ms. Puja Singh, D/o Mr. Pawan Kumar Singh

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Mukesh Sharma

Digitally signed by Mukesh Sharma
DN: c=IN, o=Personal, 2.5.4.20=dc722cfb39f6e943f9c20516205ce61be4e89040ca554c267fce8faa03f3df3f, postalCode=462016, st=Madhya Pradesh, serialNumber=a71c53529e365f965d93cb1d7da0f2979617cfc674a11e8f4d0ba86e111216ee, cn=Mukesh Sharma
Date: 2021.06.23 14:51:29 +05'30'

Subrato Howlader
Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

(Established Under Indo-German Technical Co-operation)
Opp. Manas Bhawan, Shyamla Hills, Bhopal – 462002, Madhya Pradesh, India
Ph.: 0755-2661401, 4223702, FAX: 0755-4220022.
Website: **www.crispindia.com** , e-mail: **crisponline@crispindia.com**

To whomsoever it may concern

This is to certify that **Ms. Akanksha Saraswat,** B. Tech 4th year, Electrical & Electronics Engineering, student of **Banasthali University, Rajasthan,** has successfully completed 5.5 months Industrial Project based Internship in **Machine Learning** at **TechieNest Pvt Ltd**, from **12th Jan, 2021 to 25th June 2021**.

During the internship she demonstrated good technical skills with a self-motivated attitude to learn new in Technical era. She successfully completed her projects on time.

Projects Title - Fake face mimicking using GAN. (Generative Adversarial Network)

Points of Evaluation	Max. Marks	Marks Obtained
Project Work	15	14
Assignment Completion	10	10
Attendance	10	10
Communication & presentation Skills	15	14

Internship Coordinator – Mr. Saurabh Bhardwaj

We wish her all the best for her career.

TechieNest Authorised Signatory

Siddharth Singh

Founder & Director

TechieNest Pvt Ltd

प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान (एम्प्री)
Advanced Materials and Processes Research Institute (AMPRI)

Formerly : Regional Research Laboratory/ पूर्व में : क्षेत्रीय अनुसंधान प्रयोगशाला

(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)

(Council of Scientific & Industrial Research)

होशंगाबाद रोड, हबीबगंज नाका के पास, भोपाल - 462 026 (म.प्र.) भारत

Hoshangabad Road, Near Habibganj Naka, Bhopal - 462 026 (M.P.) INDIA

ईपीएबीएक्स / EPABX : 2467609, 2467615, टेलीफैक्स / Tele Fax : 0755-2457042, 2488985, 2488355

क्रमांक / Ref.No.

दिनांक / Date. 25/06/2021

CERTIFICATE OF TRAINING

This is to certify that **Ms. VARSHA SRIVASTAVA** a student of B. Tech (Electrical and Electronics Engineering) from Banasthali Vidyapith, Tonk, Rajasthan has successfully completed her internship/training at CSIR-Advanced Materials and Processes Research Institute (CSIR-AMPRI), Bhopal during the period from January-2021 to June-2021. Her project was on **"LOW CURRENT SENSING AND MEASUREMENT OF ELECTROMAGNETIC COIL"**.

I wish her all the best for future endeavours.

H. N. Bhargaw,
Senior Principal Scientist,
CSIR-AMPRI, Bhopal

एच. एन. भार्गव/ H. N. Bhargaw
वैज्ञानिक / Scientist
प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान
Advanced Materials & Processes Research Institute
(वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्)
(Council of Scientific & Industrial Research)
होशंगाबाद रोड, भोपाल-462064
Hoshangabad Road, Bhopal-462064

Ref. No.: HZL/HR/2020-21/1 Date : 17/06/2021

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Ms. Nehal Garg;** a student of B. Tech. (Electrical & Electronics Engineering), has done her internship at **Chanderiya Lead Zinc Smelter**, **Hindustan Zinc Limited** from 04/01/2021 to 03/06/2021.

During this period, she has successfully completed the project on *"Electrical Equipment Feasibility Study for Energy-Saving & Equipment Availability at Zinc Smelter - Hydro Plant, Hindustan Zinc Ltd., Chittorgarh"* as part of her internship training.

We wish the very best for all her future endeavors.

(Authorized Signatory)
Hindustan Zinc Limited,
Chanderiya Lead Zinc Smelter,
Chittorgarh - 312021

CSIR - CENTRAL BUILDING RESEARCH INSTITUTE
ROORKEE – 247 667 (UTTARAKHAND) INDIA

Registration No. : 0044/CBRI (STM)/2020-21

TO WHOM IT MAY CONCERN

Certified that **Ms. Kanika Panwar**, student of B.Tech. (Electrical & Electronics Engg.), Banasthali Vidyapith, Rajasthan, completed her Training from 1st January, 2021 to 30th June, 2021 at this Institute.

During this period she worked on "Study on ultraviolet dosage for disinfection of pathogens and controlling of temperature and humidity in air handling units of buildings" under the supervision of Dr. Nagesh Babu Balam, Sr. Scientist, AIMS Group, CSIR-Central Building Research Institute, Roorkee

She has been found sincere and hardworking during the training period.

(Nadeem Ahmad)
Senior Principal Scientist & Training Coordinator

Date : 02.07.2021

Nadeem Ahmad
Senior Principal Scientist & Group Leader
Student Training & Mentoring Group
CSIR-Central Building Research Institute
Roorkee-247 667 (Uttarakhand)

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805.109/HR/SSPL/2621
Dated 18/06/2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that Mr./Ms./ KANISHKA UPRETI

Student of BANASTHALI VIDYPITH, RAJASTHAN Roll No. 1712779 / EEE

Branch B.Tech (EEE) has completed successfully Summer/Winter Internship for the period from 11-01-2021 to 3-06-2021 Duration (19) Nineteen weeks/months.

Topic of Internship was Literature Survey on Electronic properties of Molybdenum Dissulphide Based FETs

During the training period his/her conduct at SSPL was good.

Kapil Kumar Jain

KAPIL KUMAR JAIN
Scientist 'G'
Group Dir. - HR
Solidstate Physics Laboratory
Lucknow Road, Delhi-110054
Head-HR

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Email : arteeflow@arteeflow.com Web : www.arteeflow.com
CIN No. U29299GJ2003PTC41654

Ref No.: AFC/PUNE/21/Jul/024

Date: 01-Jul-21

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Kriti Joshi, B.Tech (Electrical and Electronics, 8th Semester) (BTBTL17025)** of **School Of Automation, Banasthali Vidyapith, Rajasthan** has successfully completed Industrial Internship Program with our company under the guidance of **Mr. Pratap Panchal, Lead Engineer.**

Duration of internship was 15-Jan-21 to 30-Jun-21, where she had gone through Process automation systems such as PLC, DCS, SCADA, etc.

She has been sincere and hardworking in all her efforts. We wish very best in all her future endeavors.

Thanking You,

FOR ARTEE FLOW CONTROLS PVT LTD

AUTHORISED SIGNATORY

ARTEE FLOW CONTROLS PRIVATE LIMITED ★ VADODARA

यू.आर.राव उपग्रह केंद्र
अंतरिक्ष विभाग
भारत सरकार
विमानपुर पोस्ट
बेंगलूरु - 560 017

U. R. Rao Satellite Centre
Department of Space
Government of India
Vimanapura Post
Bengaluru - 560 017

Certificate

DATE : 16-06-2021

This is to certify that Ms. Mitanshi Kulshrestha
of Banasthali Vidyapith, Rajasthan *has undergone*
Project training in System Engineering - Controls and Communication Group *at this Centre*
during the period from 11/01/2021 to 03/06/2021.

COURSE	:	B.Tech (Electrical & Electronics)
PROJECT TITLE	:	Auto TM PROM Data Verification and Error Detection
PROJECT MEMBERS	:	1. Anika Shrivastava 2. Preksha Tiwari 3. Nisha
PERFORMANCE	:	Excellent

(Basavaraj.S Akkimaradi)
Group Director PPEG, URSC

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
सीएसआईआर - राष्ट्रीय विज्ञान, प्रौद्योगिकी और विकास अध्ययन संस्थान (निस्टैड्स)
पूसा गेट, डा० के० एस० कृष्णन मार्ग, नई दिल्ली-110022
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH
CSIR - NATIONAL INSTITUTE OF SCIENCE, TECHNOLOGY AND DEVELOPMENT STUDIES (NISTADS)
Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 31.05.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Lavina Verma a student of B. Tech. (Electrical and Electronics, VII Semester) from School of Automation Banasthali Vidyapith, Banathali has successfully completed training from Jan. 2021 to May 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "BLUE ECONOMY IN ASPECTS OF ENERGY" which involved her to research in various aspects.

She has successful completed her training. During the time of her internship program with us she was found punctual, hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

CSIR-NISTADS

Authorized Signature.

Head PME
National Institute of Science
Technology & Developmewnt Studies
Dr. K. S. Krishnan Marg, Pusa, N. Delhi-12

Tel. : +11-25846064, 25843227, 25841630, 25843387, 25846445, 25849386
Fax : +11-25846640, 25841260, Website : http://www.nistads.res.in

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
सीएसआईआर - राष्ट्रीय विज्ञान, प्रौद्योगिकी और विकास अध्ययन संस्थान
पूसा गेट, डा० के० एस० कृष्णन् मार्ग, नई दिल्ली-110012
CSIR - NATIONAL INSTITUTE OF SCIENCE, TECHNOLOGY AND DEVELOPMENT STUDIES
Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 09.06.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Namrata Singh, a student of B. Tech. (Electrical and Electronics VII Semester)) from School of Automation Banasthali Vidyapith, Banasthali has successfully completed 8th-semester internship from Jan. 2021 to June 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "WATER BASED EPIDEMIOLOGY OF SARS –CoV-2", which involved her to research in various aspects.

She has successfully completed her training. During the time of her internship program with us she was found hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

M. Bhati

Supervisor Signature
(Dr. Madhulika Bhati)

M. Bhati

Authorized Signature.
for (Head, PME)

Head PME
National Institute of Science
Technology & Developmewnt Studies
Dr. K. S. Krishnan Marg, Pusa, N. Delhi-12

Tel. : +11-25846064, 25843227, 25841630, 25843387, 25846445, 25849386
Fax : +11-25846640, 25841260 Website : http://www.nistads.res.in

विद्युत अभियांत्रिकी विभाग
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय) वाराणसी
DEPARTMENT OF ELECTRICAL ENGINEERING
Indian Institute of Technology (Banaras Hindu University) Varanasi

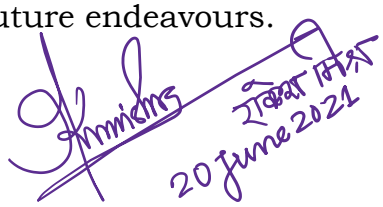
Rakesh Kumar Misra, Professor

राकेश कुमार मिश्र, आचार्य

To whom it may concern

This is to certify that **Ms. Neha Yadav** (Roll No. **BTBTL17068**) a student of B. Tech., Electrical and Electronics Engineering, Banasthali Vidyapeeth, Tonk, Rajasthan worked on her final year project entitled "**Dynamic modelling, stability and control of power system with distributed energy resources**" under my supervision during 1 January 2021 to 15 June 2021.

Her performance in the project was very good. I wish her all the success in her future endeavours.



Rakesh Kumar Misra / राकेश कुमार मिश्र

Professor, Department of Electrical Engineering / आचार्य, विद्युत् अभियांत्रिकी विभाग

IIT (BHU) Varanasi / भारतीय प्रौद्योगिक संस्थान (कशी हिन्दू विश्वविद्यालय) वाराणसी

Varanasi, Uttar Pradesh - 221005 INDIA / वाराणसी , उत्तर प्रदेश - 221005 भारत

rkmisra.eee@iitbhu.ac.in

Mobile Number / दूरभाष संपर्क : +91-9450-950-265

विद्युत अभियांत्रिकी विभाग
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय) वाराणसी
DEPARTMENT OF ELECTRICAL ENGINEERING
Indian Institute of Technology (Banaras Hindu University) Varanasi

Rakesh Kumar Misra, Professor

राकेश कुमार मिश्र, आचार्य

To whom it may concern

This is to certify that **Ms. Nilika Sinha** (Roll No. **BTBTL17040**) a student of B. Tech., Electrical and Electronics Engineering, Banasthali Vidyapeeth, Tonk, Rajasthan worked on her final year project entitled "**Power system optimization using computational intelligence**" under my supervision during 1 January 2021 to 15 June 2021.

Her performance in the project was very good. I wish her all the success in her future endeavours.

20 June 2021

Rakesh Kumar Misra / राकेश कुमार मिश्र

Professor, Department of Electrical Engineering / आचार्य, विद्युत् अभियांत्रिकी विभाग

IIT (BHU) Varanasi / भारतीय प्रौद्योगिक संस्थान (कशी हिन्दू विश्वविद्यालय) वाराणसी

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विमानपुर पोस्ट
बेंगलूरु - 560 017

U. R. Rao Satellite Centre
Department of Space
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Bengaluru - 560 017

Certificate

DATE : 16-06-2021

This is to certify that Ms. Nisha
of Banasthali Vidyapith, Rajasthan *has undergone*
Project training in System Engineering - Controls and Communication Group *at this Centre*
during the period from 11/01/2021 to 03/06/2021.

COURSE	:	B.Tech (Electrical & Electronics)
PROJECT TITLE	:	Auto TM PROM Data Verification and Error Detection
PROJECT MEMBERS	:	1. Anika Shrivastava 2. Mitanshi Kulshrestha 3. Preksha Tiwari
PERFORMANCE	:	Excellent

(Basavaraj.S Akkimaradi)
Group Director PPEG, URSC

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PIYUSH JAIN

Course Co-ordinator

Chief Executive Officer

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पिलानी, राजस्थान (भारत) / Pilani, Rajasthan - 333031 (INDIA)

Dr. Suchandan Pal
Head, Project Monitoring & Evaluation
Chairman, International Science & Technology Affairs Group

No. PME\S\Trg\BU\2021
Date: 18/06/2021

To,

The Director
Banasthali Vidyapith,
P.O. Banasthali Vidyapith
Rajasthan – 304022

CERTIFICATE OF TRAINING

This is to certify that **Ms. Parul Pundhir (BTBTL17084), B. Tech. (Electrical and Electronics Engineering)** student of your Institute has completed her project work online at this Institute during **7th January, 2021 to 18th June, 2021**. Her project was on **"State of Charge Estimation of Lithium-Ion Batteries using Kalman Filter Method".**

Her conduct during the training was satisfactory.

Head, PME

प्रमुख पी.एम.ई./Head PME
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Head, Project Monitoring & Evaluation
Chairman, International Science & Technology Affairs Group

No. PME\S\Trg\BU\2021
Date: 18/06/2021

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P.O. Banasthali Vidyapith
Rajasthan – 304022

CERTIFICATE OF TRAINING

This is to certify that **Ms. Praghya (BTBTL17039), B. Tech. (Electrical and Electronics Engineering)** student of your Institute has completed her project work online at this Institute during **7th January, 2021 to 18th June, 2021**. Her project was on **"Study and Development of Advanced Control System for BLDC Motor ".**

Her conduct during the training was satisfactory.

Head, PME

प्रमुख पी.एम.ई./Head PME
सीएसआईआर-केन्द्रीय इलेक्ट्रॉनिकी अभियान्त्रिकी अनुसंधान संस्थान
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CSIR - NATIONAL INSTITUTE OF SCIENCE, TECHNOLOGY AND DEVELOPMENT STUDIES
Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 09.06.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Pragya Yadav, a student of B. Tech. (Electrical and Electronics VII Semester)) from School of Automation Banasthali Vidyapith, Banasthali has successfully completed 8th-semester internship from Jan. 2021 to June 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "SCIENCE AND TECHNOLOGY STATUS AND CHALLENGES IN COLD STORAGE FACILITIES FOR PERISHABLE FRUITS AND VEGETABLE", which involved her to research in various aspects.

She has successfully completed her training. During the time of her internship program with us she was found punctual, hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

Supervisor Signature
(Dr. Mohd. Rais)

Authorized Signature.
for (Head, PME)

Head PME
National Institute of Science
Technology & Developmewnt Studies
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Pusa Gate, Dr. K.S. Krishnan Marg, New Delhi-110012

Dated: 31.05.2021

TO WHOMSOVER IT MAY CONCERN

This is to certify that Ms. Pratibha, a student of B. Tech. (Electrical and Electronics, VII Semester) from School of Automation Banasthali Vidyapith, Banasthali has successfully completed training from Jan. 2021 to June 2021 at National Institute of Science, Technology and Development Studies, through online in virtual mode.

She worked under the topic "TECHNOLOGY INNOVATION FOR SUSTAINABLE DEVELOPMENT" which involved her to research in various aspects.

She has successful completed her training. During the time of her internship program with us she was found punctual, hardworking and inquisitive.

This certificate is being issued to her on her own request.

We wish her every success in life.

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Head PME
National Institute of Science
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DATE : 16-06-2021

This is to certify that Ms. Preksha Tiwari
of Banasthali Vidyapith, Rajasthan *has undergone*
Project training in System Engineering - Controls and Communication Group *at this Centre*
during the period from 11/01/2021 to 03/06/2021.

COURSE	:	B.Tech (Electrical & Electronics)
PROJECT TITLE	:	Auto TM PROM Data Verification and Error Detection
PROJECT MEMBERS	:	1. Anika Shrivastava 2. Mitanshi Kulshrestha 3. Nisha
PERFORMANCE	:	Excellent

(Basavaraj.S Akkimaradi)
Group Director PPEG, URSC

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Certificate No: 5664

This is to certify that Priya Jangid

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successfully completed Internship

on Python & ML

During 01st Jan 21 to 24th June 21.

All the best.

Training Director
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Dr. Suchandan Pal
Head, Project Monitoring & Evaluation
Chairman, International Science & Technology Affairs Group

No. PME\S\Trg\BV\2021
Date: 18/06/2021

To,

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P.O. Banasthali Vidyapith
Rajasthan – 304022

CERTIFICATE OF TRAINING

This is to certify that **Ms. Ragini Kumari, BTBTL17089, B. Tech. (Electrical and Electronics Engineering)** student of your Institute has completed her project work online at this Institute during **7th January, 2021 to 16th June, 2021**. Her project was on **"Development of Unity Power Factor (UPF) Converter for Electric Vehicle (EV) Charging System".**

Her conduct during the training was satisfactory.

Head, PME

प्रमुख पी.एम.ई./Head PME
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18th June 2021

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This is to certify that **Ms. Riya Sachdeva,** D/o Mr. Durgesh Sachdeva from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Compliance"** from 4th January 2021 to 17th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Rekha Xavier
Human Resource Department

Dr. Meenakshi Tripathi
President

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E-mail : farelabs@farelabs.com
Website : www.farelabs.com

18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Riya Sachdeva,** D/o Mr. Durgesh Sachdeva from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Compliance"** from 4th January 2021 to 17th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Rekha Xavier
Human Resource Department

Dr. Meenakshi Tripathi
President

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Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

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Son/Daughter of Smt SUSHMA PARASHAR and Sh BRIJESH PARASHAR

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JAVA (CORE & ADVANCED)

conducted from JANUARY 11, 2021 to JULY 09, 2021 at C-DAC, Mohali.

Place: Mohali (Punjab)

Dated: 09.07.2021

(Dr PK Khosla)

EXECUTIVE DIRECTOR

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फैक्स/Fax : +91-172-22370 50
www.cdac.in

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Dated: 09.06.2021

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This is certified that **Mr. / Ms. Sakshi Parashar** student of Banasthali Vidyapith bearing College Roll No. 1712810 is a bonafide student of C-DAC, Mohali. He/ She is undergoing 26 weeks Industrial training on **"JAVA (Core & Advanced)"** being provided by this Centre from **11th Jan, 2021 to 9th July, 2021**. During his/her training he/she is working on the project **"Design and Development of Web Application on 'GoMovie: Online Movie Booking' using JSP, Servlets and MySQL"**.

We wish him/her good luck for his/her future endeavors.

This has been issued on his/her request for the purpose of submitting at his/her college.

Dr. Mandeep Singh
Joint Director & Controller of Examination

Centre for Development of Advanced Computing
Controller of Examination
A-34, Phase-8, Industrial Area, Mohali-160071

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एक कदम स्वच्छता की ओर

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Subrato Howlader
Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

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Solid State Physics Laboratory, Delhi

File No. 1805-113/HR/SSPL/2021
Dated 25/06/2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that ~~Mr.~~/Ms./ SANJITA PRAJAPATI
Student of Banasthali University Rajasthan Roll No. BTBTL17009
Branch Electrical and Electronic (BTech) has completed successfully ~~Summer~~/Winter Internship for the period from 04/01/2021 to 25/06/2021 Duration Six (6) weeks / months.

Topic of Internship was Implementation of Resonator on Coplanar Waveguide Structure in COMSOL Multiphysics software

During the training period ~~his~~/her conduct at SSPL was good.

Kapil Kumar Jain
KAPIL KUMAR JAIN
Scientist 'G'
Group Head
Solidstate Physics Laboratory
Lucknow Road, Delhi-110054
Head-HR

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805-113/HR/SSPL/2021
Dated 25/06/2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that ~~Mr.~~/Ms./ SANJITA PRAJAPATI
Student of Banasthali University Rajasthan Roll No. BTBTL17009
Branch Electrical and Electronic (BTech) has completed successfully ~~Summer~~/Winter Internship for the period from 04/01/2021 to 25/06/2021 Duration Six (6) weeks / months.

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During the training period ~~his~~/her conduct at SSPL was good.

Kapil Kumar Jain
KAPIL KUMAR JAIN
Scientist 'G'
Group Head
Solidstate Physics Laboratory
Lucknow Road, Delhi-110054
Head-HR

No. P. 2440/29.01.21

K.C. KASLIWAL THERMAL TRAINING INSTITUTE

Rajasthan Rajya Vidyut Utpadan Nigam Ltd.

Kota Super Thermal Power Station, Kota - 324008

CERTIFICATE

This is to Certify that Mr./ Miss Shelly Jain Student of Class B.Tech. IV th year (EEE) of Banasthali Vidyapith, (Raj.). has undergone Practical Training at Kota Super Thermal Power Station, Kota w.e.f. 30th Jan.'2021 to 29th June'2021 in various fields of this Power Station. His/ Her Performance during training Period is found Satisfactory.

Kota.

Date : 29.06.2021

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RESEARCH ARTICLE OPEN ACCESS

Incremental Conductance MPPT Algorithm for PV System Implemented Using DC-DC Buck and Boost Converter

Dhananjay Choudhary*, Anmol Ratna Saxena**
*(Department of Electrical Engineering, Madhav Institute of Technology and Science, Gwalior-474005)
** (Department of Electrical Engineering, Madhav Institute of Technology and Science, Gwalior-474005)

ABSTRACT
The two basic topologies of switch mode DC-DC converters (Buck and Boost) are analyzed with a view of their use in PV (photovoltaic) systems, as the photovoltaic generator exhibits non-linear characteristics due to the change in environmental condition and load variation. As the efficiency of PV panels is low it becomes mandatory to extract maximum power from the PV panel at a given period of time. Several MPPT algorithms with different types of converters are being proposed for extracting maximum power from the PV panel. It is found that the nature of load plays an important role in the choice of topology. This paper investigates the implementation issues of Incremental Conductance method with Buck and Boost Converters. Mathematical analysis and desirable steady-state operating point of the converters are derived to give satisfactory maximum power point tracking operation.

Keywords **-** Buck converter, Boost converter, Continuous Conduction Mode (CCM), Incremental Conductance (IC), Maximum power point tracking (MPPT), Photovoltaic (PV) system.

I. INTRODUCTION

The global demand for electric energy has increased continuously over the last few decades. Energy and the environment have become serious concerns in the today's world [1]. Alternative sources of energy generation have drawn increasing attention in recent years. Clean and renewable energy sources such as photovoltaic (PV) power generation can reply to that demand as the one of key technologies to mitigate global warning [2]. As one of distributed sources, photovoltaic (PV) power generation can be used for grid connected system or either stand alone system to reduce consumption of conventional energy [3].

However the PV system has low efficiency because of the power generated from PV system depends on the environmental condition i.e. variation in insolation and temperature may affect the output characteristics of the PV modules. A lot of research has been done to improve the efficiency of the PV modules. A number of methods to track the maximum power point of a PV module have been proposed to overcome the limitation of efficiency [4]. MPPT is used for extracting the maximum power from the solar PV module and transferring that power to the load. DC-DC converter (step up / step down) acts as an interface between the load and the PV module as it serve the purpose of transferring maximum power from the solar PV module to the load. By changing the duty cycle the load impedance is matched with the source impedance to attain the maximum power from the PV panel [5], [6]. Fig. 1 shows the DC-DC converter for operation at MPP.

In recent years, a large number of techniques have been proposed for tracking the maximum power point [5], [7]. Fractional open-circuit voltage and short-circuit current [8], stragies provide a simple and effective way to acquire the maximum power. Hill climbing and perturb and observe (P&O) methods are widely applied in the MPPT controllers due to their simplicity and easy implementation [9]-[11]. The P&O methods involves a perturbation in the operating voltage of the PV array, Incremental conductance (IC) method, which is based on the fact that the slope of the PV array power versus voltage curve is zero at the MPP has been proposed to improve the tracking accuracy and dynamic performance under rapidly varying conditions [12]. An improved MPPT algorithm for PV sources was proposed to reduce the tracking time where a dc-dc boost converter was used to track the MPP and was brought out that tracking performance depends upon the tracking algorithm used [13].

The overall performance of the PV system depends on the type of the DC-DC converter used and the algorithm used for tracking the MPPT both of this parameter plays an important role in increasing the performance of the PV array [13]. In this paper, comparative analysis of incremental conductance with buck as well as boost converter is presented by the help of Matlab & Simulink.

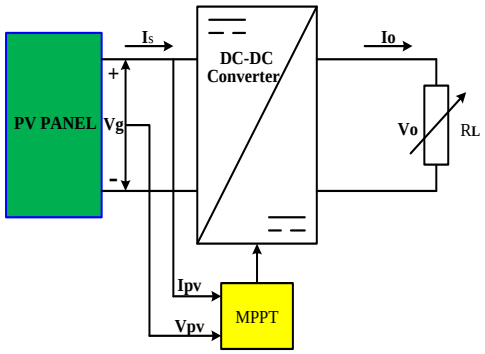


Fig. 1 DC-DC converter for operation at MPP

II. MODELING AND CHARACTERISTICS OF PV MODULE

The PV cell is a P-N semiconductor junction diode that converts solar energy in to electrical energy [14]. The equivalent circuit of a PV cell is shown in Fig.2

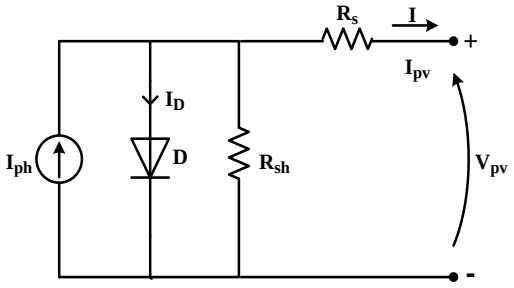


Fig. 2 Single diode model of PV cell

The basic equation from the theory of semi-conductor that mathematically describes the I-V characteristics of the ideal PV cell is given in eq (1-4), [14].

Module photo-current (I_{ph}) is given by eq (1), [15].

$$I_{ph} = \frac{[I_{scr} + K_i(T - 298)]S}{1000} \quad (1)$$

Module reverse saturation current (I_{rs}) is given by eq (2), [15].

$$I_{rs} = \frac{I_{sc}}{e^{(qVoc/NsKAT)} - 1} \quad (2)$$

Module saturation current (I_0) is given by eq (3), [15].

$$I_0 = I_{rs}\left[\frac{T}{Tr}\right]^3 e^{\frac{qE_{go}}{BK(1/Tr - 1/T)}} \quad (3)$$

The current output of PV-module (I_{pv}) is given by eq (4), [15].

$$I_{pv} = N_p I_{ph} - NI_0\left[e^{\frac{q(V_{pv} + I_{ph}R_s)}{N_s AKT}} - 1\right] \quad (4)$$

Where,

V_{pv} is the output voltage of a PV module, T_r is the reference temperature =298K, T is module operating temperature in Kelvin, A is an ideality factor=1.6, K is the Boltzmann constant = 1.3805×10^{-23}J/K, q is the Electron charge =1.6×10^{-19}C, Rs is the series resistance of PV module , I_{sc} is the short circuit current of a PV module, K_i is the temperature co-efficient =0.0017, S is the reference insolation =1000W/m^2 , E_{go} is the band gap os silicon = 1.1eV, V_{oc} is the open circuit voltage [14].

The effect in the change of solar insolation level is illustrated from the output characteristics of PV module fig. 3 and 4 shows the typical I-V and P-V characteristics for different solar insolation keeping the ambient temperature constant at 25^{0}C. As the insolations increases the output current increases significantly which results in the increase of output power [14].

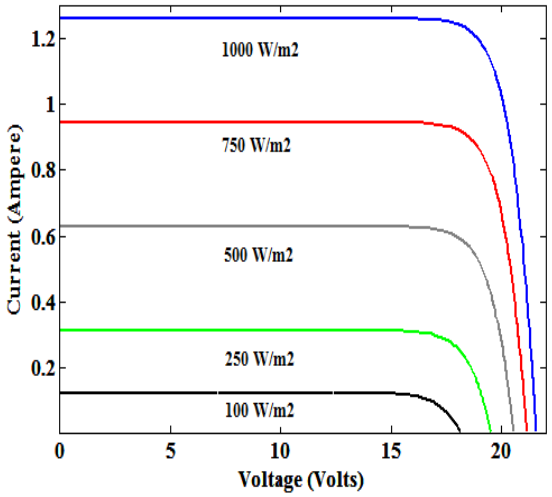


Fig. 3 Characteristic curve of (Ipv-Vpv) at different solar insolation

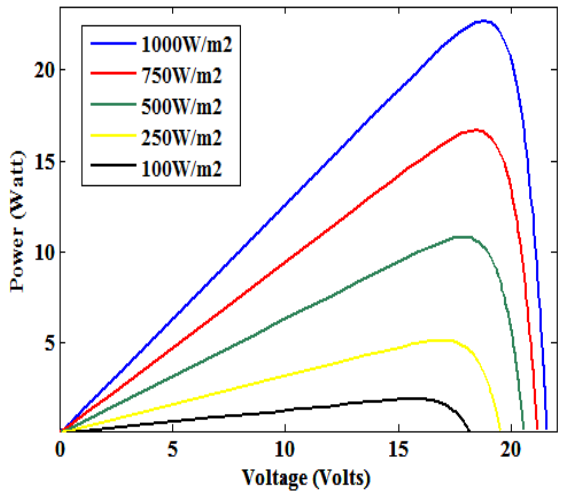


Fig. 4 Characteristics curve of (Ppv-Vpv) at different solar insolation

III. DC-DC CONVERTER FOR PV SYSTEM

The basic function of any switch mode dc-dc converter in any PV system is to work as intermediate power processor which changes the

levels of voltage and current such that maximum power can be extracted from the PV array [16], [17]. For PV system with batteries the MPP of commercial PV module is set above the charging voltage of batteries for most combinations of insolation and temperature. A buck converter can operate at the MPP under most conditions, but it cannot do so when MPP goes below the battery charging voltage under a low insolation and high- temperature condition. Thus, the additional boost capability can slightly increase the overall efficiency [15].

3.1 DC-DC BUCK CONVERTER

The dc-dc buck converter converts a higher dc input voltage to lower dc output voltage. The basic dc-dc buck converter topology is shown in Fig. 5. It consists of a controlled switch S_W , an uncontrolled switch diode (D), an inductor L, an capacitance C and a load resistance R [16].

In the description of converter operation it is assumed that all the components are ideal and also the converter operates in Continuous conduction mode (CCM). In CCM operation the inductor current flows continuously over one switching period. The switch is either ON or OFF according to the switching position this results in two circuit states. The first sub-circuit state is when the switch is turned ON, the diode is reverse biased and inductor current flows through the switch [18],

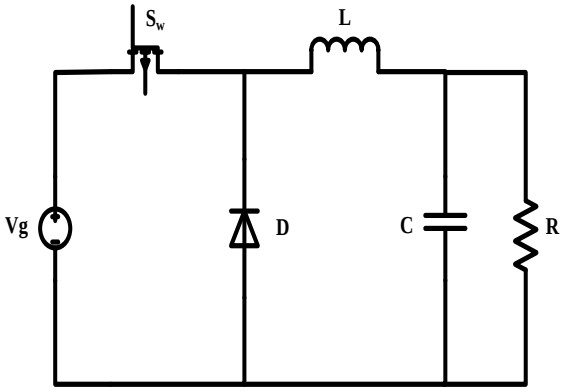
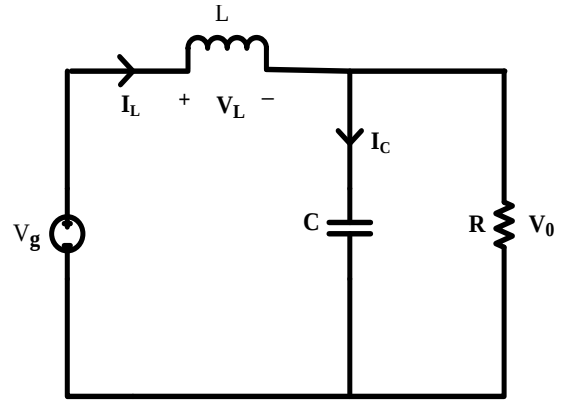
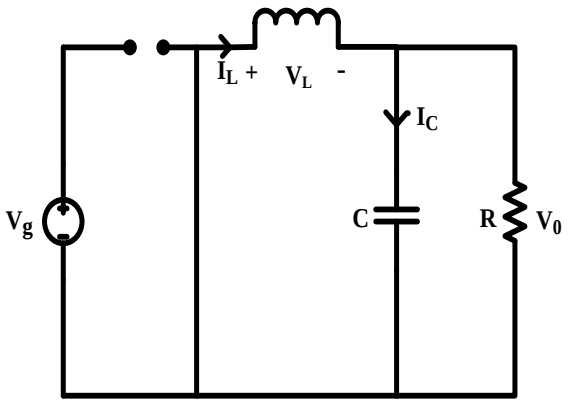


Fig. 5 DC-DC buck converter topology



(a)



(b)

Fig.6 .Buck Converter Circuit when switch:- (a) turns ON (b) turns OFF

which is shown in Fig. 6(a). The second sub-circuit state is when the switch is turned OFF and current freewheels through the diode [19] which is shown in Fig. 6(b).

When switch S_W is ON and D is reverse biased, then inductor current i_L and capacitor voltage V_C are given by eq. (5) and (6).

$$\frac{di_L}{dt} = \frac{1}{L}V_g - V_o \tag{5}$$

$$\frac{dv_0}{dt} = \frac{dv_c}{dt} = \frac{1}{C}i_c \tag{6}$$

When the switch is OFF and D is forward biased, i_L and capacitor voltage V_C are given by eq. (7) and (8).

$$\frac{di_L}{dt} = -\frac{1}{L}V_0 \tag{7}$$

$$\frac{dv_0}{dt} = \frac{dv_c}{dt} = \frac{1}{C}i_c \tag{8}$$

The state space representation for converter circuit configuration can be expressed as given in eq. (9)

$$\frac{dx}{dt} = \begin{Bmatrix} A_1x + B_1U \text{when Sw is closed} \\ A_2x + B_2U \text{when Sw is opened} \end{Bmatrix}$$

Where

$$\mathbf{X} = [x_1 x_2]^T = [V_c i_L]^T \tag{9}$$

The state transition matrix A, and B input matrix are system matrices as shown in eq. (10)

$$A_1 = A_2 = \begin{bmatrix} \frac{-1}{L}\left(r_L + \frac{ar_C}{R}\right) & \frac{-a}{RL} \\ \frac{1}{C}\left(1 - \frac{ar_C}{R}\right) & \frac{-a}{RC} \end{bmatrix}, B_1 = \begin{bmatrix} \frac{1}{L} \\ 0 \end{bmatrix}, B_2 = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \tag{10}$$

Where $a = \dfrac{R}{R + r_C}$

3.2 DC-DC BOOST CONVERTER

A boost converter can be also called as the step up converter because the DC voltage output is higher than its DC voltage input [20]. It is a sort of power converter, which is composed by two semi-conductor switches (Diode and Mosfet) and one energy storage element. The basic dc-dc boost topology is shown in Fig. 7. Boost converter operates in two modes.

During the mode-1 operation which is shown in Fig. 8 (a) when switch (S_w) is closed the inductor current get charged through the input source and stores the energy. In this mode inductor current rises (exponentially) but for simplicity we assume that the charging and discharging of the inductor are linear. The diode blocks the current flowing and so the load current remains constant which is being supplied due to discharging of the capacitor

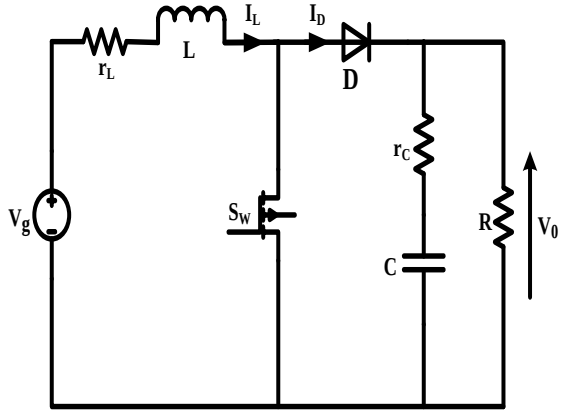


Fig. 7 DC-DC boost converter topology

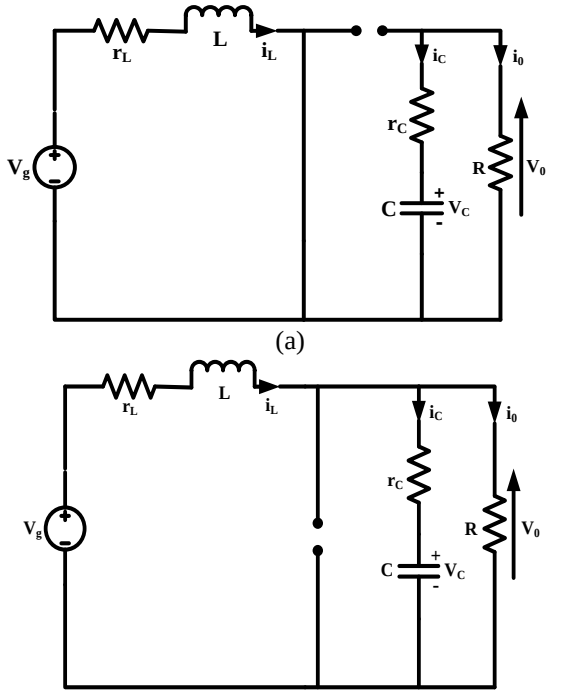


Fig. 8 Boost converter circuit (a) when switch is ON (b) when switch is OFF

Inductor current and capacitor voltage equation for mode-1 are given by eq (11) and (12)

$$\frac{di_L}{dt} = \frac{1}{L}\left[V_g - i_L r_L\right] \tag{11}$$

$$\frac{dV_C}{dt} = \left[\frac{-1}{C\left(R + r_C\right)}\right] V_C \tag{12}$$

During the mode-2 operation which is shown in Fig. 8 (b) the switch (S_w) is open and so the diode become short circuited. The energy stored in the inductor get discharged through opposite polarities which charge the capacitor. The load current remains constant throughout the operation. Inductor current and capacitor voltage equation for mode-2 are given by eq (13) and (14)

$$\frac{di_L}{dt} = \frac{1}{L}\left[V_g - i_L\left(r_L + ar_C\right) - aV_C\right] \tag{13}$$

$$\frac{dV_C}{dt} = i_L\left[\frac{1}{C} - \frac{ar_C}{RC}\right] - \frac{a}{RC} V_C \tag{14}$$

The state space analysis, Input transition matrix, Output transition matrix are given by eq. (15)

$$A_1 = \begin{bmatrix} \frac{-r_L}{L} & 0 \\ 0 & \frac{-1}{C(R+r_C)} \end{bmatrix}, A_2 = \begin{bmatrix} \frac{-1}{L}\left(r_L + ar_C\right) & \frac{-aV_C}{L} \\ \frac{1}{C} - \frac{ar_C}{RC} & \frac{-a}{RC} \end{bmatrix}, B_1 = B_2 = \begin{bmatrix} \frac{1}{L} \\ 0 \end{bmatrix},$$

$$E_1 = \begin{bmatrix} 0 & a \end{bmatrix}, E_2 = \begin{bmatrix} ar_C & a \end{bmatrix}, F_1 = F_2 = \begin{bmatrix} 0 \end{bmatrix} \tag{15}$$

IV. INCREMENTAL CONDUCTANCE MPPT ALGORITHM

A typical solar panel converts about 30-40 % of the incident solar insolation in to electrical energy [20]. Maximum power point tracking technique is used to improve the efficiency of the solar panel. According to maximum power transfer theorem, the power output of a circuit is maximum when the Thevenin impedance of the circuit (source impedance) matches with the load impedance [21], [22]. Hence the problem of tracking the maximum power point reduces to an impedance matching problem. There are several techniques to track the MPPT but this paper deal with Incremental conductance

4.1 INCREMENTAL CONDUCTANCE ALGORITHM

Incremental Conductance method uses the information of source voltage and current to find the desired operating point. From the P-V curve of a PV module shown in Fig. 4 it is clear that slope is zero at maximum point [23], so the formulas are as follows

$$\left(\frac{dP}{dV}\right)\text{mpp} = \frac{d\left(VI\right)}{dV} \tag{16}$$

$$0 = I + V\left(\frac{dI}{dV}\right)MPP \quad (17)$$

$$\left(\frac{dI}{dV}\right)MPP = -\frac{I}{V} \quad (18)$$

Equation (18) is the condition to achieve the maximum power point, when the variance of the output conductance is equal to the negative of the output conductance, the module will work at the maximum power point [21]. The flow chart of the incremental conductance is shown in Fig. 9.

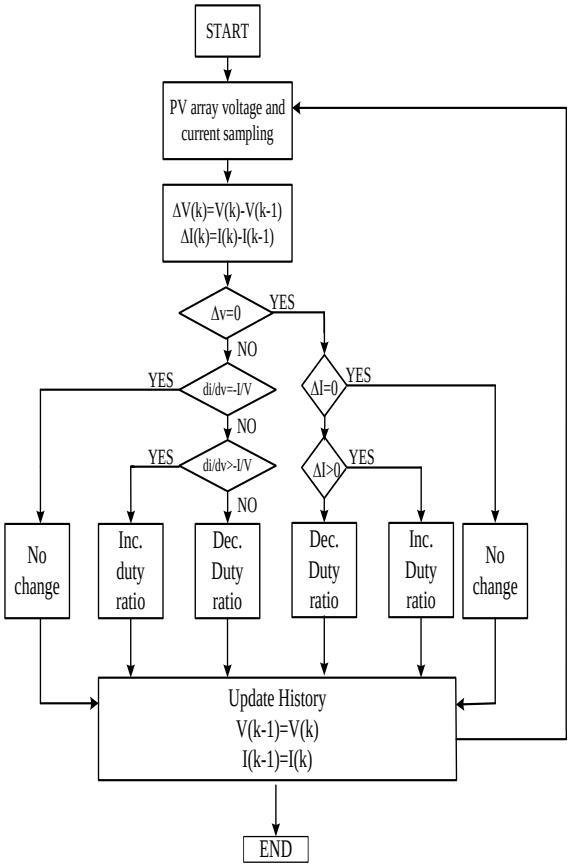


Fig. 9 Flow chart of the Incremental Conductance method

In this flow chart, V(k) is the new detection voltage and I(k) is the new detection current, V(k-1) and I(k-1) is previous detection values. When the new value is read in to the program, it calculates the previous value compare with the new one, and then determine the voltage differentials is zero or not, according the voltage differentials is zero, the current difference can be determined zero or not. If both of them are zero, it shows that they have the same value of impedance and the value of duty ratio will remain the same as before. If the voltage differential is zero, but the current differential is not zero, it shows that the insolation has changed. When the difference of the current values is greater than zero, duty ratio will increase, when the difference of the current value is less than zero the duty ratio will decrease. If the voltage differential is not zero determine it whether satisfy the eq. 18 or not, when eq. 18 is satisfied the slope of the power curve will be zero that means the system is operating at MPP, if the variance of conductance is greater than the negative conductance values, it means the slope of the power curve is positive and the duty ratio is to be increased, otherwise it should be decreased [22], [23].

The intersection of current-voltage (I-V) curve and the load line gives the operating point of directly coupled PV module to the load [5] which is shown in the fig.10

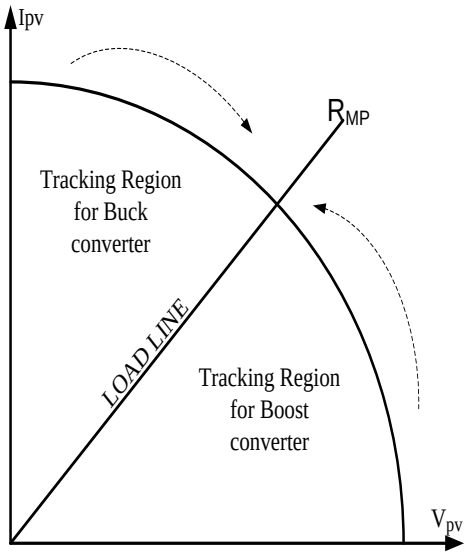


Fig. 10 Tracking of optimal resistance for Buck and Boost converter

This point should be at the MPP of the PV module to extract the maximum power. The performance of DC-DC converter depends on the input impedance and the connected load R_L. For the boost converter the selected load resistance R should be greater than the R_{MP} i.e ($R>R_{MP}$). And the tracking region for boost converter lies below the load line. For the buck converter the selected load resistance R should be less than the (R_{MP}) ($R<R_{MP}$) [24], [25]. And the tracking region for buck converter operation should be above the load line.

For boost converter voltage gain is given by eq. (19)

$$\frac{V_0}{V_g} = \frac{1}{1-D} \quad (19)$$

Load matching resistance for boost converter is given by eq. (20)

$$R_{in} = R_L(1-D)^2 \quad (20)$$

For buck converter voltage gain and load matching resistance expression are given in eq. (21) and (22)

$$\frac{V_0}{V_g} = D \qquad (21)$$

$$R_{in} = \frac{R_L}{D^2} \qquad (22)$$

Where V_g,V_0 are the input and output voltages, R_{in} is the input resistance seen by the PV panel at the source side of the converter, R_L is the resistance which is connected at the load side of the converter and D is the duty ratio [26].

V. RESULT AND DISCUSSION

All simulation results for buck and boost converter have been recorded to make sure the comparison of the circuit can be determined accurately. The input, output voltages, current and power is the main comparisons to take in to the consideration. The complexity and simplicity of the circuit have been determined based on the literature. For checking the robustness of the converters a step change in insolation is given at a simulation time of 0.05 which changes insolation from 500W/m^2 to 1000W/m2 at a fixed ambient temperature 25^0c. Fig. 11, 12 and 13 shows the variation in input voltage, current, power and Fig. 14, 15 and 16 shows the variation in output voltage, current and power respectively. From the expression shown in eq (20) it is clear that the load connected across the boost converter should be maximum then the Rin (resistance seen by PV panel) show a fixed resistance of 100Ω is connected across the load side of the boost converter to extract the maximum power from the PV panel. Fig. 17 shows the change in duty cycle with change in solar insolation to provide the suitable duty ratio for the converter so that it may operate at the MPP.

Similarly form the eq (22) the load matching resistance for the buck converter i.e RL should lower than the input resistance. A fixed resistance of 4.5Ω is connected at a load side of buck converter to match the input resistance. Fig. 18, 19 and 20 shows the variation in input voltage, current and power for the change in insolation level from 500W/m2 to 1000W/m2 at a simulation time of 0.05. Fig. 21, 22 and 23 shows the change in output voltage, current and power respectively. Change in duty cycle for buck converter is shown in Fig. 24

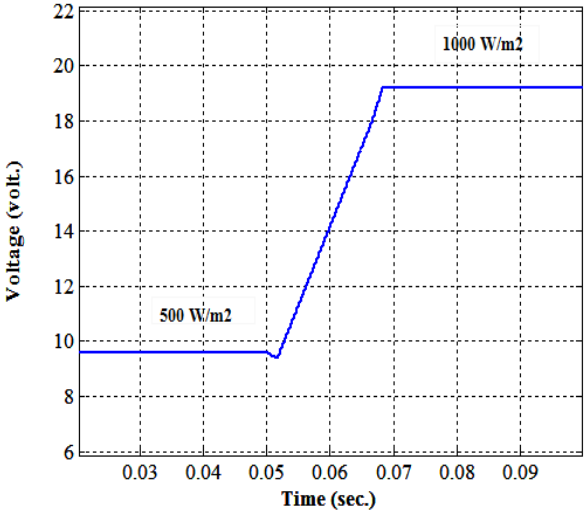


Fig.11 Input voltage of boost converter

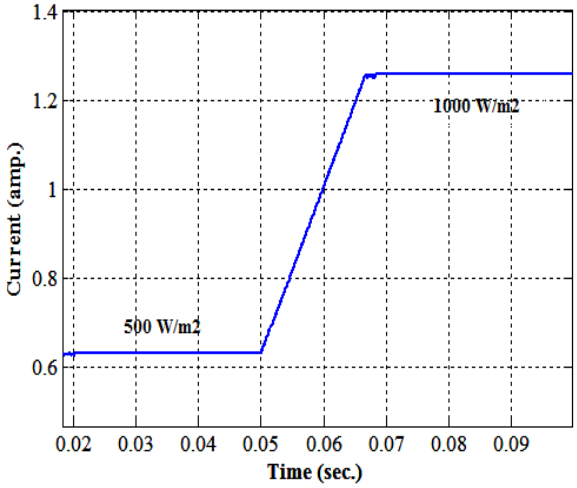


Fig. 12 Input current of boost converter

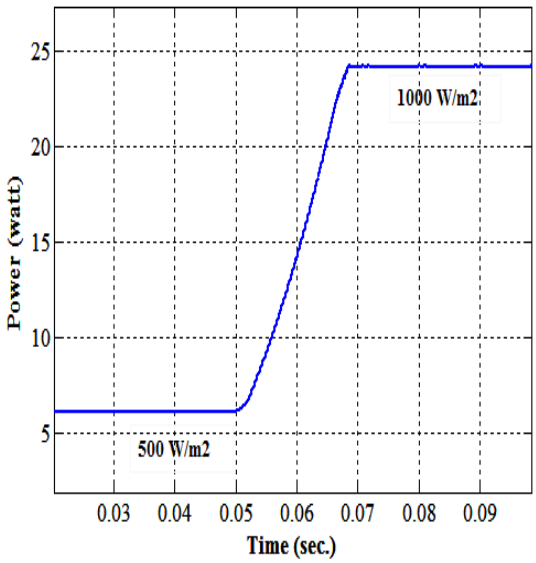


Fig. 13 Input power of boost converter

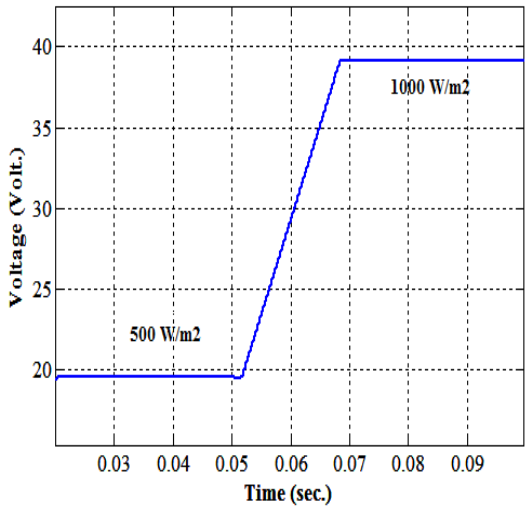


Fig. 14 Output voltage of boost converter

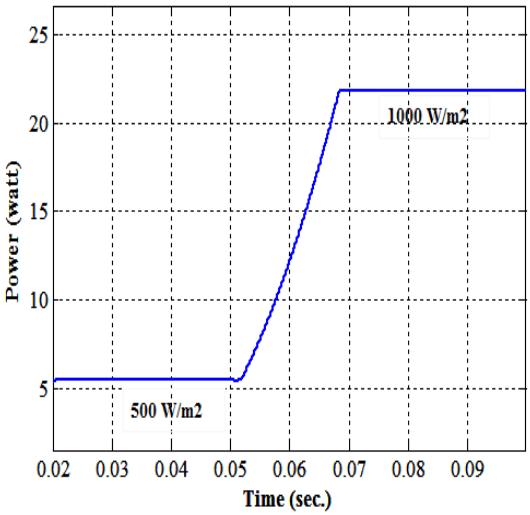


Fig. 16 output power of boost converter

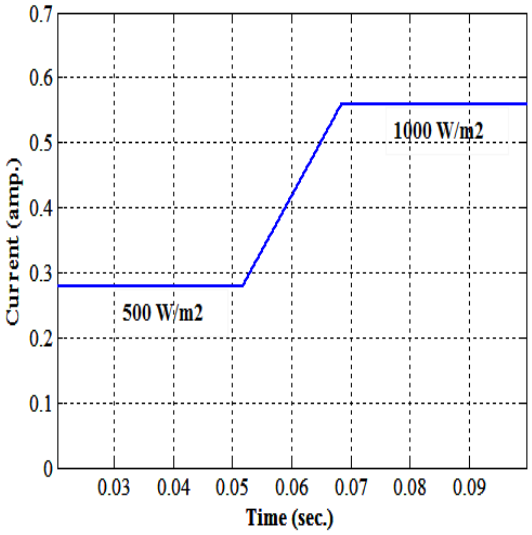


Fig.15 Output current of boost converter

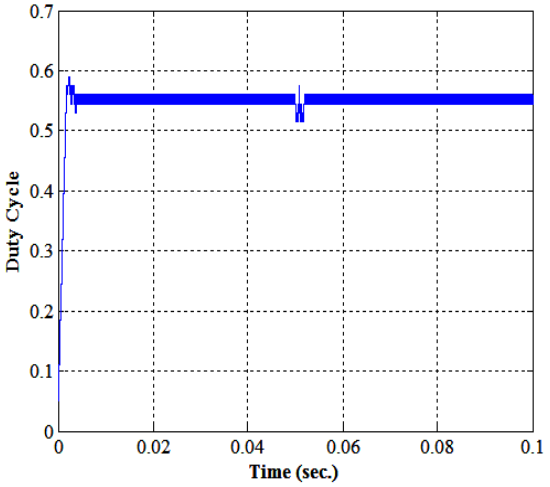


Fig. 17 Duty cycle for boost converter

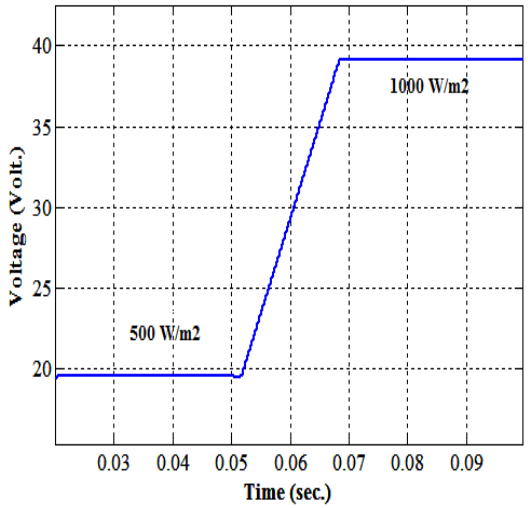


Fig. 15 Output voltage of boost converter

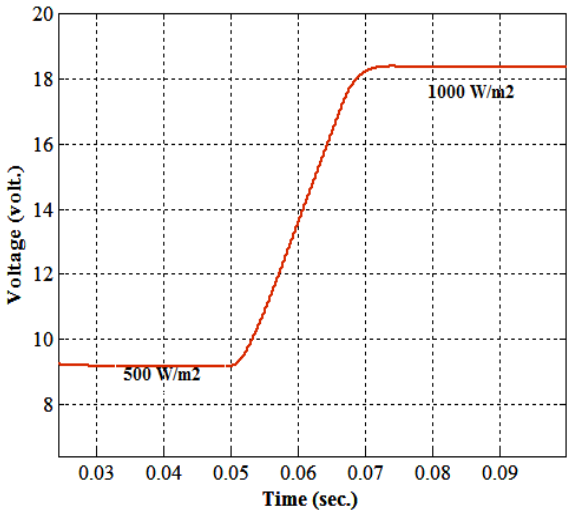


Fig.18 Input voltage of buck converter

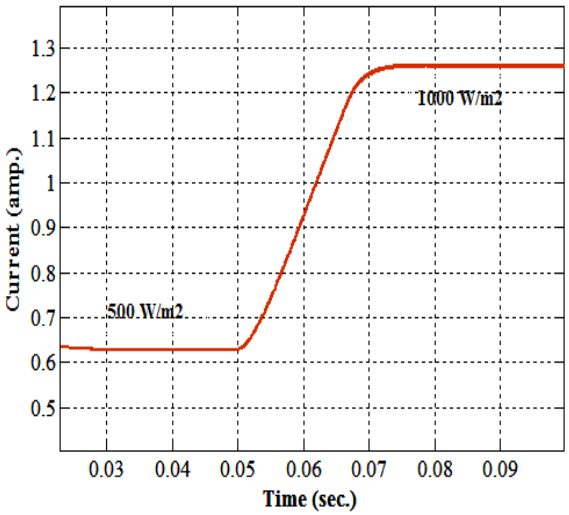


Fig. 19 Input current of pv panel

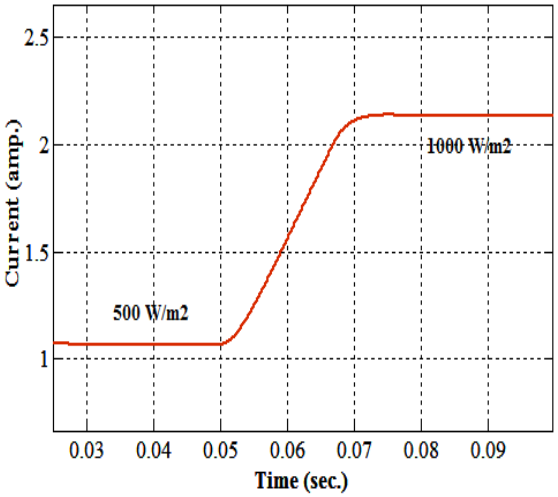


Fig.22 Output current of buck converter

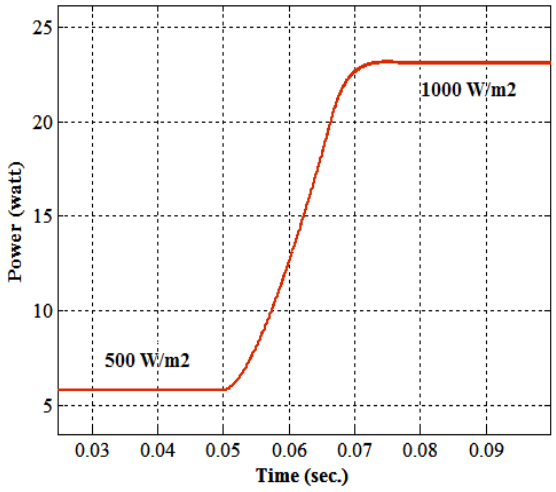


Fig. 20 Input power of buck converter

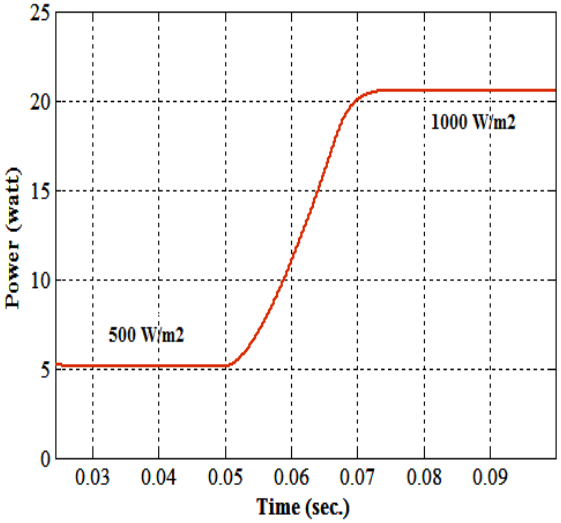


Fig. 23 output power of buck converter

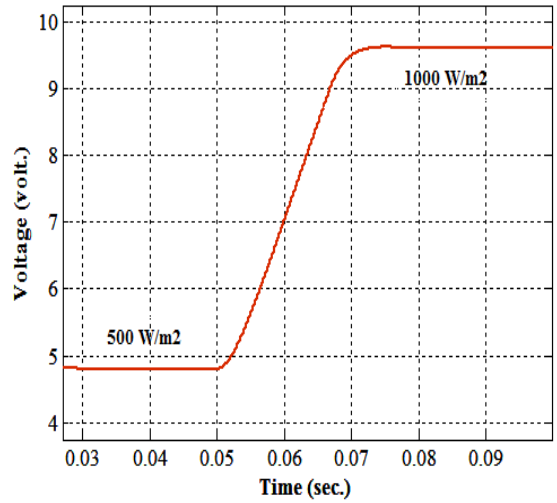


Fig.21 output power of buck converter

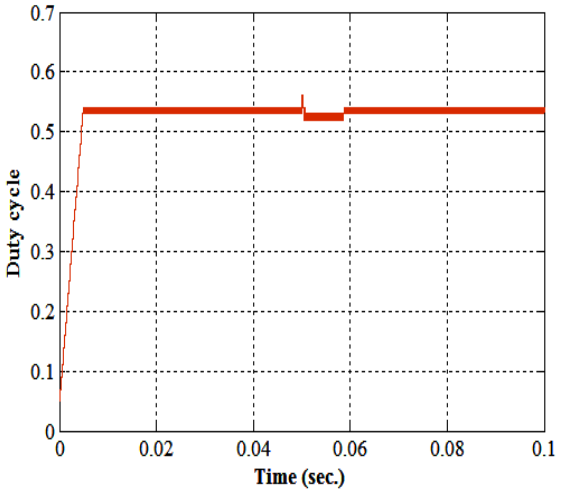


Fig. 24 Duty cycle modulation of buck converter

VI. CONCLUSION

A standalone photovoltaic system connected with buck and boost converter had been implemented

using IC MPPT algorithm for extracting maximum power at different environmental condition. The nature of load plays an important role during the operation of DC-DC converter operating at MPPT by analyzing both the converter we have found that for the Boost converter operating at MPP the load resistance R should be greater than R_{mp} ($R>R_{mp}$). Similarly for buck converter ($R<R_{mp}$). This study reveal that the IC algorithm gives the satisfactory results with both the converter and it get less confuse due to change in environmental conditions.

VII. ACKNOWLEDGEMENTS

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ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805.118 /HR/SSPL/2021
Dated 05-07-2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that Mr./~~Ms.~~/ SHRADDHA

Student of Vanasthali Vidyapith, Jaipur Roll No. _____

Branch B.Tech.(Electrical & Electronics) has completed successfully ~~Summer~~/Winter Internship for the period from 01-Jan-2021 to 30-June-2021 Duration 06 months weeks / months.

Topic of Internship was Design of Adaptive Filter using MATLAB

During the training period his/her conduct at SSPL was good.

Manda Khanaje
Head-HR

ISO 9001:2015 Certified

ठोसावस्था भौतिकी प्रयोगशाला, दिल्ली
Solid State Physics Laboratory, Delhi

File No. 1805..33../HR/SSPL /2021
Dated 17-06-2021

(Min. of Defence, DRDO)
Lucknow Road, Timarpur, Delhi-110054

प्रशिक्षण प्रमाणपत्र /TRAINING CERTIFICATE

This is to certify that ~~Mr.~~/Ms./ SHRADHA MADAN
Student of BANASTHALI VIDYAPITH, RAJASTHAN Roll No. BTBTL17086
Branch B.TECH, VIII SEM, E&E. has completed successfully Summer/Winter Internship for the period from 01 JAN. 2021 to 15 JUNE '21 Duration 22 weeks / ~~months~~.

Topic of Internship was SMART MATERIALS AND SENSORS FOR DEFENCE APPLICATIONS.

During the training period ~~his~~/her conduct at SSPL was good.

KAPIL KUMAR JAIN
Scientist 'G'
Group Dir. - HR
Solidstate Physics Laboratory
Lucknow Road, Delhi-110054
Head-HR

INDIAN INSTITUTE OF TECHNOLOGY PATNA

Bihta, Patna – 801106, Bihar, India

Dept. of Computer Science & Engineering

Dr. Jimson Mathew
Head

Contact:- 0612-302-8329
E-mail:- cse_head@iitp.ac.in

May 22nd 2021

To whom it may concern

It gives me immense pleasure to write this certificate in favor of **Miss. Shreshtha Sharan**, a fourth-year B.Tech student of Electrical & Electronics Engineering at Banasthali Vidyapith, Tonk, Rajasthan. She has worked under my guidance in the department of Computer Science & Engineering of Indian Institute of Technology, Patna as an intern from December 23, 2020, to May 22nd, 2021. During her internship, she has learnt the basic concepts of Machine Learning (Domain Adaptation).

I found that she is a very hardworking, self- motivated individual who is keen on completing tasks on time and has shown commitment and diligence towards her internship work and I wish her all success in her future endeavours.

Should you have any questions do not hesitate to contact me.

Thanking you

Jimson Mathew

Indian Institute of Technology Patna

+91-(0)612-3028347 (office)

E-Mail : jimson@iitp.ac.in

SELDOM
INDIA TECHNOLOGIES

CERTIFICATE OF COMPLETION

Certificate No: 5661

This is to certify that Shriya

of Banasthali Vidyapith

successfully completed Internship

on PLC & SCADA

During 01st Jan 21 to 1th June 21.

All the best.

Training Director
Seldom India

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E-mail : farelabs@farelabs.com
Website : www.farelabs.com

18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Shubhangi Singh,** D/o Mr. Arun Singh from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Compliance"** from 4th January 2021 to 17th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Rekha Xavier
Human Resource Department

Dr. Meenakshi Tripathi
President

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18th June 2021

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This is to certify that **Ms. Shubhangi Singh,** D/o Mr. Arun Singh from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has successfully completed her dissertation entitled **"Calibration and Compliance"** from 4th January 2021 to 17th April 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Rekha Xavier
Human Resource Department

Dr. Meenakshi Tripathi
President

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TRAINING CERTIFICATE

This is to certify that **Ms. Somya Sharma,** D/o Lt. Brajraj Sharma from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has completed her dissertation entitled **"Proficiency testing on calibration under ISO-17043"** from 4th January 2021 to 14th April 2021 at **FARE Labs Pvt. Ltd.**

We wish her best in her future endeavors!

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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18th June 2021

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This is to certify that **Ms. Somya Sharma,** D/o Lt. Brajraj Sharma from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics Engineering, has completed her dissertation entitled **"Proficiency testing on calibration under ISO-17043"** from 4th January 2021 to 14th April 2021 at **FARE Labs Pvt. Ltd.**

We wish her best in her future endeavors!

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

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We wish her best in her future endeavors!

Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
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THIS CERTIFICATE IS PROUDLY PRESENTED TO:

Sonali Verma

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the student was found to be dedicated, hardworking and intelligent

27-06-2021
DATE

P. Naveen
Academic Head

Certificate ID: 3010838430

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Sonali Verma

Has successfully completed Internship On Web Development
from 01-03-2021 to 30-04-2021. During his/her internship,
the student was found to be dedicated, hardworking and intelligent

04-06-2021
DATE

P. Naveen
Academic Head

Certificate ID: 264912043

CERTIFICATE OF COMPLETION

This certificate is presented to

SONAM KUMARI

for completing five months of internship from **21 Dec 2020** to **21 May 2021** and handling it all like a champ!

We wish you well in your future endeavors.

2 June, 2021

Date

Mr. Divanshu Dodeja
(Founder)

Cert. No :- CRISP/21/228/ONL06/00686

Reg. ID : - 2021/JSEEIEPOL/01/6

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in recognition of his/her participation in Online

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Conducted on/during 02-01-2021 to 21-06-2021

Subrato Howlader

Course Co-ordinator

Chief Executive Officer

Issue Date :-21-06-2021

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This Certificate is awarded to

Ms. Supriya Barthwal, D/o Mr. Rakesh Kumar

in recognition of his/her participation in Online

"Internship on Electronics Programming"

Conducted on/during 02-01-2021 to 21-06-2021

Subrato Howlader
Course Co-ordinator

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18th June 2021

TRAINING CERTIFICATE

This is to certify that **Ms. Suruchi Sinha,** D/o Mr. Suman Kumar Sinha from **Banasthali Vidyapith, Rajasthan,** B. Tech Electrical and Electronics, has successfully completed her dissertation entitled **"Compliance and Calibration"** from 4th January 2021 to 18th June 2021 at **FARE Labs Pvt. Ltd.** and has been awarded excellent grade on the basis of her performance.

She has accomplished the training successfully. We have found her sincere and devoted during the training.

Girija S. Giri
Human Resource Department

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18th June 2021

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Girija S. Giri
Human Resource Department

Dr. Meenakshi Tripathi
President

सीएसआईआर केन्द्रीय इलेक्ट्रॉनिकी अभियांत्रिकी अनुसंधान संस्थान
CSIR-CENTRAL ELECTRONICS ENGINEERING RESEARCH INSTITUTE
(विज्ञान तथा प्रौद्योगिकी मंत्रालय / MINISTRY OF SCIENCE & TECHNOLOGY, भारत सरकार / GOVT. OF INDIA)
पिलानी, राजस्थान (भारत) / Pilani, Rajasthan - 333031 (INDIA)

Dr. Suchandan Pal
Head, Project Monitoring & Evaluation
Chairman, International Science & Technology Affairs Group

No. PME\S\Trg\BU\2021
Date: 24/06/2021

To,

The Director
Banasthali Vidyapith,
P.O. Banasthali Vidyapith
Rajasthan – 304022

CERTIFICATE OF TRAINING

This is to certify that **Ms. Sushma, BTBTL17007, B.Tech. (Electrical and Electronics Engineering)** of your Institute has completed her project work online at this Institute during **7th January, 2021 to 20th June, 2021**. Her project was on "**IoT Based Smart Hydroponic System".**

Her conduct during the training was satisfactory.

Head, PME

प्रमुख पी.एम.ई. / Head PME
सीएसआईआर-केन्द्रीय इलेक्ट्रॉनिकी अभियान्त्रिकी अनुसंधान संस्थान
CSIR-Central Electronics Engineering Research Institute
पिलानी, राजस्थान / Pilani, Rajasthan-333031

Swateya

भारतीय प्रौद्योगिकी संस्थान
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No. 2472

TRAINING CERTIFICATE

(To be completed by the Supervisor under whom the student has taken the training)

Name of the Student ..... Swateya Gupta .....

Father's Name Mr Ashok Kumar Gupta Mother's Name Mrs. Archana Gupta

Name of the Institute/College ..... Banasthali Vidyapith .....

Course ..... B. Tech. ..... Branch Electrical Engg. ..... Semester VIII .....

Week / Month	Date		Actual working days put in	Remarks	Signature of the Project Supervisor
	From	To			
1st	16 Feb	28 Feb	07	Analysed research papers	
2nd	1 March	31 March	15	practiced simple ANN programs	
3rd	1 April	30 April	20	simulated power system models on MATLAB	
4th	1 May	31 May	20	Collected data of IEEE standard 9-bus system	
5th	1 June	30 June	30	Finally detected and classified faults	
6th					
7th					
8th					

Evaluation ..... The performance of the candidate was satisfactory .....

Conduct ..... Good .....

Other Remarks, if any ..... The candidate completed all the tasks assigned.

.....
Signature of the Supervisor
Name: S. P. Singh
Date:
आचार्य / PROFESSOR
विद्युतीय अभियांत्रिकी विभाग / Department of Electrical Engineering
भारतीय प्रौद्योगिकी संस्थान / Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय) / (Banaras Hindu University)
Varanasi, U.P. (INDIA)

.....
Signature of Head of the Department
(Department Seal
आचार्य एवं विभागाध्यक्ष / PROFESSOR & HEAD
विद्युतीय अभियांत्रिकी विभाग / Department of Electrical Engineering
भारतीय प्रौद्योगिकी संस्थान / Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय) / (Banaras Hindu University)
Varanasi, U.P. (INDIA)

.....
Training and Placement Officer
प्रशिक्षण एवं प्रस्थापना प्रकोष्ठ
Training and Placement Cell
भारतीय प्रौद्योगिकी संस्थान (का.हि.वि.)
Indian Institute of Technology (BHU)
वाराणसी/Varanasi-221005

EXPERIENCE CERTIFICATE

TO WHOM IT MAY CONCERN

Dated: July 1st 2021

This is to certify that **Ms. SWATI JAIN** identity number **ID: ROBOCMSME202114** has been working in our organization as an intern from period October **1st March 2021** to July **1st 2021** .During the tenure, her services were found to be satisfactory in carrying out the job duties.

Her responsibilities were to:

- ✓ Developing Algorithm for the projects Idea given
- ✓ Creating Embedded Systems Logics
- ✓ Working on Real Time Python for path planning
- ✓ Adaptive program for Robots in conditional states
- ✓ Working on Real Time Projects on Adaptive Robotic Path Planning

I want to personally thank you for all of this but also for your steadfast loyalty and commitment, to our company's success.

We wish her good luck for her future assignments.

Private Organization:

CIN NO: U72900AP2019PTC112448
NAME : Robocoupler Pvt Ltd
ADDRESS: IT SEZ, HILL-03, RUSHIKONDA
VISAKHAPATNAM, INDIA
530017

ANDHRA PRADESH Innovation Society

Robocoupler Visakhapatnam Solutions
Praveen Malla

Managing Director

Robocoupler Pvt Ltd

Swati

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No. 2471

TRAINING CERTIFICATE

(To be completed by the Supervisor under whom the student has taken the training)

Name of the Student ....Swati Shekhawat.....

Father's Name ....Mr. Raghuraj Shekhawat.... Mother's Name Mrs. Sunita Shekhawat

Name of the Institute/College .....BANASTHALI VIDYAPITH.....

Course B.TECH..... Branch ELECTRICAL ENG..... Semester VIII.....

Week / Month	Date		Actual working days put in	Remarks	Signature of the Project Supervisor
	From	To			
1st	16 FEB	28 FEB	07	Analysed research papers	
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3rd	1 APRIL	30 APRIL	20	simulated power system models on MATLAB	
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6th					
7th					
8th					

Evaluation ....The performance of the candidate was satisfactory.....

.....

Conduct ....Good.....

Other Remarks, if any ....The candidate completed all the tasks assigned.....

.....
Signature of the Supervisor
Name: S. P. Singh
Date:
आचार्य / PROFESSOR
विद्युतीय अभियांत्रिकी विभाग / Department of Electrical Engineering
भारतीय प्रौद्योगिकी संस्थान / Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय) / (Banaras Hindu University)
Varanasi, U.P. (INDIA)

.....
Signature of Head of the Department
(Department Seal
आचार्य एवं विभागाध्यक्ष / PROFESSOR & HEAD
विद्युतीय अभियांत्रिकी विभाग / Department of Electrical Engineering
भारतीय प्रौद्योगिकी संस्थान / Indian Institute of Technology
(काशी हिन्दू विश्वविद्यालय) / (Banaras Hindu University)
Varanasi, U.P. (INDIA)

.....
Training and Placement Officer

प्रशिक्षण एवं प्रस्थापना प्रकोष्ठ
Training and Placement Cell
भारतीय प्रौद्योगिकी संस्थान (का.हि.वि.)
Indian Institute of Technology (BHU)
वाराणसी/Varanasi-221005

Sahasra Sambhav Skill Development Pvt. Ltd.
A-4, Phase-II Noida-201305, U.P.
E-mail : skill@sahasraelectronics.com, website : www.sahasraelectronics.com

Reg. No.: - SSSDPL/2020-21/UNN1007F/010 **Date- 24th June. 2021**

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Unnati Sharma (Aadhaar No. 774147883272)**, D/O Mr. Vikas Sharma has taken training in our group company **Sahasra Electronics Pvt. Ltd., Noida** from the period 11th Jan. 2021 to 31st May 2021

During her tenure here, she received training on PCB Designing & Manufacturing, Advance EMS (PCB Assembly & SMT), Basics of LED Lighting, Basics of Solar Technology & QMS.

Her conduct during the period was very good and found her hardworking and dedicated.

We wish her success and blessings for her future Career.

Sahasra Sambhav Skill Development Pvt. Ltd. A-4 Phase-II Noida 201305

Authorized Signatory
Sahasra Sambhav Skill Development Pvt. Ltd.

विद्युत अभियांत्रिकी विभाग
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय)
वाराणसी
DEPARTMENT OF ELECTRICAL ENGINEERING
Indian Institute of Technology (Banaras Hindu University) Varanasi

Rakesh Kumar Misra, Professor

राकेश कुमार मिश्र, आचार्य

To whom it may concern

This is to certify that **Ms. Vaishnavi Pandey** (Roll No. **BTBTL17117**) a student of B. Tech., Electrical and Electronics Engineering, Banasthali Vidyapeeth, Tonk, Rajasthan worked on her final year project entitled "**Power system forecasting using computational intelligence"** under my supervision during 1 January 2021 to 15 June 2021.

Her performance in the project was very good. I wish her all the success in her future endeavours.

20 June 2021

Rakesh Kumar Misra / राकेश कुमार मिश्र

Professor, Department of Electrical Engineering / आचार्य, विद्युत् अभियांत्रिकी विभाग

IIT (BHU) Varanasi / भारतीय प्रौद्योगिक संस्थान (कशी हिन्दू विश्वविद्यालय) वाराणसी

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Reg. No.: - SSSDPL/2020-21/VAN0123F/012 **Date- 24th June. 2021**

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Vanshika Sharma (Aadhaar No. 535119334333)**, D/O Mr. Krishan Murari Sharma has taken training in our group company **Sahasra Electronics Pvt. Ltd., Noida** from the period 8th Jan. 2021 to 24th June 2021

During her tenure here, she received training on PCB Designing & Manufacturing, Advance EMS (PCB Assembly & SMT), Basics of LED Lighting, Basics of Solar Technology & QMS.

Her conduct during the period was very good and found her hardworking and dedicated.

We wish her success and blessings for her future Career.

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Date: 24-June-2021

To,
The Head of Department
School Of Automation
Banasthali Vidyapith
Rajasthan, India

Sub: Internship Certificate

Respected Sir/Ma'am,

This is to certify that Ms**. Vertika Sharma, ID No: BTBTL17075**, student of B.tech Electrical and Electronics branch from Banasthali Vidyapith. She has worked under supervision during her internship in **AdvanceTech India Pvt. Ltd.** I am pleased to state that she has worked hard in achieving her allotted goal and she has been able to present a good picture of the concerned works based upon duration of 5 months.

Vertika Sharma possesses a good moral character and pleasing personality. I wish her every success in life.

Thanking you
For AdvanceTech Pvt.Ltd.

Arvind Dixit
Authorized Signature

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वाराणसी
DEPARTMENT OF ELECTRICAL ENGINEERING
Indian Institute of Technology (Banaras Hindu University) Varanasi

Rakesh Kumar Misra, Professor

राकेश कुमार मिश्र, आचार्य

To whom it may concern

This is to certify that **Ms. Yashashwini Devray** (Roll No. **BTBTL17019**) a student of B. Tech., Electrical and electronics engineering, Banasthali Vidyapeeth, Tonk, Rajasthan worked on her final year project entitled "**Simulation of speed control of Brushless DC motor using PID controller**" under my supervision during 1 January 2021 to 15 June 2021.

Her performance in the project was very good. I wish her all the success in her future endeavours.

20 June 2021

Rakesh Kumar Misra / राकेश कुमार मिश्र

Professor, Department of Electrical Engineering / आचार्य, विद्युत् अभियांत्रिकी विभाग

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Ref. NJSEI/Delhi/2021/3154

Date: 01.07.2021

TO WHOM IT MAY CONCERN

This is to certify that **Ms. Yukti Agarwal**, a student of 4th year B.Tech (Electrical and Electronics) in Banasthali University, has done her internship in Electrical Department at our company from 1st March 2021 to 30th June 2021.

She has worked on the project titled 'Construction of 318 MLD (70 MGD) Wastewater Treatment Plant with 10 years Operation & Maintenance on DBO basis at Coronation Pillar, Delhi'. She has worked under my guidance during which she demonstrated good design skills, understanding technical specification and work management with a self-motivated attitude to learn new things. She has learned basic concepts covering this project and completed her tasks on time.

I wish her all the success in her future endeavours.

Regards

Agarwal

NJS ENGINEERS INDIA PVT. LTD. NJS INDIA

Pankaj Agarwal

Project Manager / DTL
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