



## Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no. 21, Dharamshala, Distt. Kangra, Himachal Pradesh- 176215

### SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

## Certificate

It is certified that Ms. Anu Kumari, M.Sc. student of Department of Environmental Sciences, Central University of Himachal Pradesh completed her project work entitled "Study of Seasonal Variation of Discharge in Manjhi Khad, Kangra, Himachal Pradesh" under my supervision. Her work is authentic and is not published anywhere.

*Anu Kumari*

**Anu Kumari**

(Student)

*Anurag Linda*  
6th Sept 2021

**Dr. Anurag Linda**

(Project supervisor)

**Prof. Deepak Pant**

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
(Dean)  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
**Central University of Himachal Pradesh**

(Established Under Central University Act 2009)  
P O Box. 21, Dharamshala, Distt. Kangra, Himachal Pradesh-176215

Prof. Deepak Pant

Email: deepakpant1@rediffmail.com

Phone: +91-9816639032

DEAN, SCHOOL OF EARTH & ENVIRONMENTAL SCIENCES

**CERTIFICATE -I**

This is to certify that the project entitled, “**LONG- TERM TREND ANALYSIS OF DAILY MAXIMUM TEMPERATURE (Tmax), DAILY MINIMUM TEMPERATURE(Tmin) AND DIURNAL TEMPERATURE RANGE (DTR) OVER KANGRA REGION**” is being submitted by **Mr. Abhishal Sharma, Enrollment ID: CUHP19ENV02**, a student of Master of Science, Department of Environmental Sciences, School of Earth and Environmental sciences, Central university of Himachal Pradesh, TAB Shahpur, Kangra, as a partial fulfillment of the requirement of Master of Science in Environmental Sciences under Central University of Himachal Pradesh.

It is certified that report is the result of his own investigation. The work and result embodied in this report has not been submitted to any University or Institute for award of research degree.

Date:

(Prof. Deepak Pant)

DEAN

Place:

School of Earth and Environmental Sciences

Central University of Himachal Pradesh  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक / Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.) / Shahpur Kangra (H.P.)-176205



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

(Established Under Central University Act 2009)  
P O Box. 21, Dharamshala, Distt. Kangra, Himachal Pradesh-176215

**CERTIFICATE-II**

It is to certify that **Mr. ABHISHAL SHARMA**, M.Sc. Environmental Sciences (Semester -IV) Department of **Environmental Science**, Central University of Himachal Pradesh during the session 2019-2021 has completed his dissertation work (ENV 575) entitled "**LONG- TERM TREND ANALYSIS OF DAILY MAXIMUM TEMPERATURE (T<sub>max</sub>), DAILY MINIMUM TEMPERATURE (T<sub>min</sub>) AND DIURNAL TEMPERATURE RANGE (DTR) OVER KANGRA REGION**", under my supervision.

Signature of the Candidate

*Abhishal*

**Abhishal Sharma** Dr. ANKIT TANDON  
(CUHP19ENV02)

*Dr. Ankit Tandon*  
27th Sep 2021  
(Project supervisor)

**Dr. Ankit Tandon**  
Assistant Professor  
Deptt. of Environmental Sciences  
Central University of Himachal Pradesh

Head of the Department



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय (हि.प्र.के. वि.)

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no.21,Dharamshala,Distt.Kangra,

Himachal Pradesh-176215

(Temporary Academic Block, Shahpur)

## CERTIFICATE-I

It is to certified that **Ms. Agrata Aggarwal**, M.Sc. Environmental Sciences (Semester -1V) Department of **Environmental Science**, Central University of Himachal Pradesh during the session 2019-2021 has completed his dissertation work (ENV 575) entitled, “**Literature Review on Bacterial Degradation of Organosporous Pesticides by Enzymatic Action with Special Focus on Profenofos Pesticides**” under my supervision.

Signature of the Candidate

**Agrata Aggarwal**

(CUHP19ENV04)

Date : 02-09-2021

**Prof. Deepak Pant**

Head of the Department

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

**Dr. Subhankar Chatterjee**

(Project supervisor)

**Dr. Subhankar Chatterjee**  
Assistant Prof. Env. Sci.  
School of Earth & Environmental Sciences  
Central University of Himachal Pradesh  
Dharamshala, H.P.-176215



# हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

(2009 केन्द्रीय विश्वविद्यालयों अधिनियम के तहत स्थापित)

धर्मशाला, जिला कांगड़ा-176,215

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

Dharamshala, District Kangra, Himachal Pradesh-176215

## SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

### Certificate

It is to certified that I, **Akshita**, Msc. (Semester-IV), Department of Environmental Science, Central University of Himachal Pradesh has completed my dissertation work (ENV 575) entitled "***A Preliminary Study of Glacier Dynamics: A Case study of Shah Glacier, Ravi Basin, Himachal Himalaya (India)***" from the Department of Environmental Sciences, Central University of Himachal Pradesh. I declare to the best of my knowledge that no part of my Dissertation was earlier submitted for the award of research degree of any University.

*Akshita*

**AKSHITA**

(CUHP19ENV05)

(Candidate)

*Anurag Linda*  
6<sup>th</sup> Sept 2021

**Dr. Anurag Linda**

(Project Supervisor)

**Prof. Deepak Pant**

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
(Dean)

Head, Department of Environmental Sciences

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

अस्थायी शैक्षणिक खण्ड/Temporary Academic Block

शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

अस्थाई शैक्षणिक खण्ड, शाहपुर, जिला काँगड़ा, (हि.प्र.) - 176206

Temporary Academic Block, Shahpur, Distt. Kangra (HP) - 176206

School of Earth and Environmental Sciences

**CERTIFICATE**

It is certified that **Mr. Ashwani Kumar** student of M.Sc. Department of Environmental Sciences; Central University of Himachal Pradesh has completed his project work entitled "**Study of Leachate in Groundwater**" under my supervision. His work is authentic and is not published anywhere.

**PLACE:** CUHP, TAB SHAHPUR

*Ashwani*

**Ashwani Kumar**

(Student)

**Dr. Dilbag Rana**

(Project Supervisor)

Assistant Professor

Department of Earth and Environmental Sciences

*Prof. Deepak Pant*

अधिष्ठाता, पृथ्वी विज्ञान (संसाधन) विज्ञान स्कूल  
Dean, School of Earth & Environmental Sciences

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

अस्थाई शैक्षणिक खण्ड, शाहपुर, जिला काँगड़ा, (हि.प्र.) - 176206  
Temporary Academic Block, Shahpur, Distt. Kangra (HP) - 176206

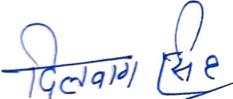
# CERTIFICATE

It is certified that this project work entitled: **A REVIEW ON GREEN SYNTHESIS OF NANOPARTICLES; CHARACTERISATION & ITS APPLICATIONS** as part of the project work towards the completion of MSc. in Environmental Sciences for the session 2019-2021 by **DIKSHA**, Roll No. **CUHP19ENV11** of Department of Environmental Science in the School of Earth & Environmental Sciences, Central University of Himachal Pradesh. We declare that no part of this project is submitted anywhere for the award of any degree/diploma.

  
Candidate  
**DIKSHA**  
(CUHP19ENV11)

Dean  
**Dr. DEEPAK PANT**  
विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

Supervisor  
**Dr. PANKAJ THAKUR**

  
Co-Supervisor  
**Dr. DILBAG SINGH RANA**



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय (हि.प्र.के. वि.)

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no.21,Dharamshala,Distt.Kangra,

Himachal Pradesh-176215

(Temporary Academic Block, Shahpur)

### CERTIFICATE-I

It is to certified that **Dimple kumari**, M.Sc. Environmental Science (Semester -IV) Department of **Environmental Science**, Central University of Himachal Pradesh during the session 2019-2021 has completed her dissertation work (ENV 575) entitled, “**Environmental migration due to climate change, effects on apple production in Kullu valley region** ” under my supervision.

Signature of the Candidate

**Dimple kumari**  
(CUHP19ENV12)

Date : 02 -09- 2021

**Prof. Deepak Pant**  
Head of the Department *03/09/2021*

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक/Temporary Academic Block  
धरमशला (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

**Prof. Subhankar Chatterjee**  
(Project supervisor)

**Dr. Subhankar Chatterjee**  
Assistant Prof. Env. Sci.  
School of Earth & Environmental Sciences  
Central University of Himachal Pradesh  
Dharamshala, HP-176215

*Chatterjee*  
*02/09/2021*



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय (हि.प्र.के. वि.)

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no.21,Dharamshala,Distt.Kangra,

Himachal Pradesh-176215

(Temporary Academic Block, Shahpur)

## CERTIFICATE-I

It is to certified that **Mr. Ishwar Dass**, M.Sc. Environmental Science (Semester -IV) Department of **Environmental Science**, Central University of Himachal Pradesh during the session 2019-2021 has completed his dissertation work (ENV 575) entitled, “**Plastic Pollution After Covid-19 And Its Management**” under my supervision.

*Ishwar Dass*

Signature of the Candidate

**Ishwar Dass**  
(CUHP19ENV14)

Date: 02-09-2021

**Prof. Deepak Pant**  
Head of the Department

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

*Chatterjee*  
02/09/2021

**Dr. Subhankar Chatterjee**  
(Project supervisor)

**Dr. Subhankar Chatterjee**  
Assistant Prof. Env. Sci.  
School of Earth & Environmental Sciences  
Central University of Himachal Pradesh  
Dharamshala, HP-176215



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थाई शैक्षणिक खण्ड, शाहपुर, जिला कांगड़ा, (हि.प्र.) - 176206  
Temporary Academic Block, Shahpur, District Kangra (H.P.) - 176206

**School of Earth and Environmental Sciences**

**CERTIFICATE**

This is to certify that the dissertation entitled, "*Study on Application of Activated Carbon in Water Treatment*" submitted in partial fulfillment of the requirements for the award of the degree of **Master of Science (Environmental Sciences)** in the Central University of Himachal Pradesh, Dharamshala is a bonafide research work done under my supervision and that no part of this thesis has been submitted for any other degree or diploma.

The assistance and help received during this investigation have been fully acknowledged.

**PLACE: CUHP, TAB SHAHPUR**

**Jameel Mohammad**  
(Student)

**Dr. Dilbag Rana**  
(Project Supervisor)  
Assistant Professor  
Department of Earth and Environmental Sciences  
Central University of Himachal Pradesh

**Prof. Deepak Pant**  
(Dean)



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय (हि.प्र.के. वि.)

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no.21,Dharamshala,Distt.Kangra,

Himachal Pradesh-176215

(Temporary Academic Block, Shahpur)

### CERTIFICATE-I

It is to certified that **Mr. Jwngsar Brahma**, M.Sc. Environmental Sciences (Semester -1V) Department of **Environmental Science**, Central University of Himachal Pradesh during the session 2019-2021 has completed his dissertation work (ENV 575) entitled, “**A review on Quantification of Persistent Organic Pesticides residues in the atmosphere, special focus on OCPs (Organochlorine Pesticides)**” under my supervision.

Signature of the Candidate

**Jwngsar Brahma**

(CUHP19ENV16)

Date: 02-09-2021

Prof. Deepak Pant

Head of the Department

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शाहपुर, कांगड़ा (हि. प्र.)/Shahpur, Kangra (H.P.)-176206

**Dr. Subhankar Chatterjee**

(Project supervisor)

Dr. Subhankar Chatterjee  
Assistant Prof. Env. Sci.  
School of Earth & Environmental Sciences  
Central University of Himachal Pradesh  
Dharamshala, HP-176215

हिमाचल प्रदेश के द्रीय विश्वविद्यालय

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

PO Box no. 21, Dharamshala, Distt. Kangra, Himachal Pradesh- 176215

## SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

### Declaration

It is certified that **Miss Kritika** student of M.Sc. Department of Environmental Sciences, Central University of Himachal Pradesh completed her project work entitled "*Long term trend analysis of Precipitation data over Kangra region, Himachal Pradesh*" under my supervision. This work is authentic and is not published anywhere.

*Kritika*  
**Kritika**

(Student)

*Ankit Tandon*  
**Dr. Ankit Tandon**

(Supervisor)

**Dr. Ankit Tandon**  
Assistant Professor  
Deptt. of Environmental Sciences  
Central University of Himachal Pradesh

*Dr. Deepak Pant*  
**Dr. Deepak Pant**

अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश के द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
Academic  
37  
शांतिपुर, कांगड़ा जिला, हिमाचल प्रदेश - 176215



# हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

(2009 केन्द्रीय विश्वविद्यालयों अधिनियम के तहत स्थापित)  
धर्मशाला, जिला कांगड़ा-176,215

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

Dharamshala, District Kangra, Himachal Pradesh-176215

## SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

### Certificate

It is to certified that I, **Ms. LIZA GULERI** has carried out the research embodied in the present dissertation work entitled "**Municipal Solid Waste & It's Impact on Soil Quality : A Review**" for the MSc project (Course Code: ENV 575) in the Department of Environmental Sciences, Central University of Himachal Pradesh. I declare to the best of my knowledge that no part of this dissertation was earlier submitted for the award of research degree of any university.

*Liza Guleri*  
06/09/2021  
**Liza Guleri**  
(CUHP19ENV18)  
(Candidate)

*Anurag Linda*  
**Dr. Anurag Linda**  
(Project Supervisor)

*Prof. Deepak Pant*  
09/09/2021  
**Prof. Deepak Pant**  
(Dean)  
विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक (Temporary Academic Block)  
शाहिबपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206  
शाहिबपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

(Established under Central Universities Act 2009)  
Dharamshala, Distt. Kangra, Himachal Pradesh- 176215

**SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES**

**Certificate**

It is to certified that **Ms. Neha kumari**, Msc. Environmental Science (Semester-IV) Department of Environmental Science, Central University of Himachal Pradesh during the session 2019-2021 has completed her dissertation work (ENV 575) entitle "A review of surface ozone burden and trends" under my supervision. I declare to the best of my knowledge that no part of this Dissertation was earlier submitted for the award of research degree of any University.

*Neha kumari*

**Neha kumari**  
(CUHP19ENV20)  
(Candidate)

*Ankit Tandon*  
28/09/2021

**Dr. Ankit Tandon**

(Project Supervisor)  
**Dr. Ankit Tandon**  
Assistant Professor  
Deptt. of Environmental Sciences  
Central University of Himachal Pradesh

**Dr. Deepak Pant**

(DEAN)  
अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान स्कूल  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक / Temporary Academic Block  
शाहपुर, कांगड़ा जिला / Shahpur, Kangra (H.P.)-176206



हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
**Central University of Himachal Pradesh**  
(Established under Central Universities Act 2009)  
Dharamshala, Distt. Kangra, Himachal Pradesh- 176215

**SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES**

**Certificate**

It is to certified that I **Ms. Payal Verma**, Department of Environmental Sciences, Central University of Himachal Pradesh have completed my dissertation work (ENV 575) entitled “**A Preliminary study of water quality of springs of Kangra District**” from the Department of Environmental Sciences, Central University of Himachal Pradesh. I declare to the best of my knowledge that no part of this Dissertation was earlier submitted for the award of research degree of any University.

*Payal Verma*

PAYAL VERMA  
(CUHP19ENV21)  
(Candidate)

*Anurag Linda*  
6<sup>th</sup> Sept 21

**Dr. Anurag Linda**  
(Project supervisor)

**Prof. Deepak Pant**

(Dean)  
अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान विभाग  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

Central University of Himachal Pradesh

अस्थायी शैक्षणिक खण्ड, शाहपुर, जिला काँगड़ा, (हि.प्र.) - 176206

Temporary Academic Block, Shahpur, Distt. Kangra (HP) – 176206

School of Earth and Environmental Sciences

### CERTIFICATE

This is to certify that the dissertation entitled, “*Assessment of potential pollutants in Groundwater near Dharamshala: A Case Study*” submitted in partial fulfillment of the requirements for the award of the degree of **Master of Science (Environmental Sciences)** in the Central University of Himachal Pradesh, Dharamshala is a bonafide research work done under my supervision and that no part of this thesis has been submitted for any other degree or diploma.

The assistance and help received during this investigation have been fully acknowledged.

*Priyanka Negi*

**Priyanka Negi**

(Student)

*Dr. Dilbag Rana*

**Dr. Dilbag Rana**

(Project Supervisor)

Assistant Professor

Department of Earth and Environmental Sciences

Central University of Himachal Pradesh

**Prof. Deepak Pant**

(Dean)

अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान स्कूल  
Dean, School of Earth & Environmental Sciences

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शाहपुर, काँगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

## CERTIFICATE

It is to certify that Ms. Ruhina Shivpuri, student of M.Sc. in Environmental Science (CUHP19ENV24), Department of Environmental Sciences, School of Earth and Environmental Sciences, Central University of Himachal Pradesh,

Dharamshala, Himachal Pradesh has successfully completed her M.Sc. dissertation work entitled "A REVIEW: SYNTHESIS OF WASTE DERIVED NANOPARTICLES: CLASSIFICATION & APPLICATION" in the partial fulfilment of the requirements for the award of the degree of M.Sc. in Environmental Sciences during the session 2019-2021. This dissertation is an original contribution with existing knowledge and faithful record of work carried out by her under my guidance and supervision. This work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere

Ruhina Shivpuri



**Dr. Pankaj Thakur**

[supervisor]



**Dr. Dilbag Rana**

[supervisor]

Deptt. Of Earth and Environmental Sciences

Central University of H P

**Dr. Deepak Pant**

Dean, Department of Environmental Sciences  
Dean, School of Earth & Environmental Sciences  
Central University of Himachal Pradesh  
Dharamshala, Himachal Pradesh



हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय

[ केन्द्रीय विश्वविद्यालय अधिनियम 2009 के अन्तर्गत स्थापित ]

Central University of Himachal Pradesh

[ Established under Central Universities Act, 2009 ]

## CERTIFICATE

A certificate that the dissertation titled *Plastic Pollution leads to climate change: a critical review* embodies an original work of Shivali completed under my supervision and guidance in the Department of Environmental Sciences, Central University of Himachal Pradesh. Further, the work has not been submitted either in part or fully for any other purpose in any university. I consider it worthy of submission for the partial fulfillment for the award of the degree of Master of Science in Environmental Science.

Prof. Deepak Panu

Head of the Department

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शहपुर, कांगड़ा (हि. प्र.)/Shahpur, Kangra (H.P.)-176206

Dr. Subhankar Chatterjee

Assistant professor

Department of Environmental Science

Central University of Himachal Pradesh

Dr. Subhankar Chatterjee

Assistant Prof. Env. Sci.

School of Earth & Environmental Sciences

Central University of Himachal Pradesh

Dharamsala, HP-176215



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh

(Established under Central Universities Act 2009)  
Dharamshala, Distt. Kangra, Himachal Pradesh- 176215

**SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES**

**Certificate**

It is to certified that **Ms. Shruti Sharma**, MSc. Environmental Science (Semester-IV) Department of Environmental Science, Central University of Himachal Pradesh during the session 2019-2021 has completed her dissertation work (ENV 575) entitled **“A Review of NOx Pollution characteristics in the atmosphere”** under my supervision. I declare to the best of my knowledge that no part of this Dissertation was earlier submitted for the award of research degree of any University.

*Shruti Sharma*  
**SHRUTI SHARMA**  
**(CUHP19ENV29)**  
(Candidate)

*Ankit Tandon*  
**Dr. Ankit Tandon**  
(Project Supervisor)

**Dr. Ankit Tandon**  
Assistant Professor  
Deptt. of Environmental Sciences  
Central University of Himachal Pradesh

**Dr. Deepak Pant**  
(Dean)  
अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान स्कूल  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक ब्लॉक/Temporary Academic Block  
शासण केंद्र, हि.प्र. शम्पुर, कांगड़ा (हि.प्र.)



हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

(2009 केन्द्रीय विश्वविद्यालय अधिनियम के तहत स्थापित)

धर्मशाला, जिला कांगड़ा-176,215

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

Dharamshala, District Kangra, Himachal Pradesh-176215

## SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

### Certificate

It is certified that I, **Sweety Sharma**, master student of Department of Environmental Science, Central University of Himachal Pradesh has completed her dissertation work (ENV 575) entitled "**Water pollution potential threats from Municipal Solid Waste Landfill sites: A Review**" from the Department of Environmental Sciences, Central University of Himachal Pradesh. I declare to the best of my knowledge that no part of my Dissertation was earlier submitted for the award of research degree of any University.

*Sweety Sharma*

**SWEETY SHARMA**

(CUHP19ENV30)

(Candidate)

*Anurag Linda*  
6<sup>th</sup> Sept 2021

**Dr. Anurag Linda**

(Project Supervisor)

**Prof. Deepak Pant**

विभागाध्यक्ष, पर्यावरण विज्ञान विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केंद्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176206

## CERTIFICATE

It is to certified that I Ms. TAMANNA DEVI, Department of Environmental Sciences, Central University of Himachal Pradesh have completed my

Dissertation work (ENV 575) entitled "A mini review on organic acids in the atmospheric aerosol over India" from the Department of Environmental Sciences, Central University of Himachal Pradesh. I have assert to the best of my facts that no component of this Dissertation work was previous submitted for the honor of research degree in any of the University.

*Tamanna*

**TAMANNA DEVI**

**(CUHP19ENV31)**

*Ankit Tandon*  
*08/09/2021*

**PROF. ANKIT TANDON**

**(PROJECT SUPERVISOR)**  
**Dr. Ankit Tandon**  
**Assistant Professor**  
**Deptt. of Environmental Sciences**  
**Central University of Himachal Pradesh**

**PROF. DEEPAK PANT**

**(DEAN)**

*08/09/2021*

अधिष्ठाता, पृथ्वी विज्ञान एवं पर्यावरण विज्ञान स्कूल  
Dean, School of Earth & Environmental Sciences  
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
आस्थापी शैक्षणिक संस्थान, कुलु, हिमाचल प्रदेश  
शाखा, पोस्टाई 171 001, कुलु (H.P.)



# हिमाचल प्रदेश केंद्रीय विश्वविद्यालय

(2009 केन्द्रीय विश्वविद्यालयों अधिनियम के तहत स्थापित)

धर्मशाला, जिला कांगड़ा-176,215

Central University of Himachal Pradesh

(Established under Central Universities Act 2009)

Dharamshala, District Kangra, Himachal Pradesh-176215

## SCHOOL OF EARTH AND ENVIRONMENTAL SCIENCES

### Certificate

It is to certified that I, **Upasana**, Msc. Environmental Science (Semester-IV) Department of Environmental Science, Central University of Himachal Pradesh during the session 2019-2021 has completed her dissertation work (ENV 575) entitled "*Study of Optical Properties of Water Using Smartphone Sensor: A case study of Dal Lake Dharamshala, Himachal Pradesh*" under the supervision of **Dr. Anurag Linda**, Department of Environmental Sciences, Central University of Himachal Pradesh. I declare to the best of my knowledge that no part of my Dissertation was earlier submitted for the award of research degree of any University.

*Upasana*  
6/9/21

**UPASANA**  
(CUHP19ENV32)  
(Candidate)

*Anurag Linda*

**Dr. Anurag Linda**  
(Project Supervisor)

*Prof. Deepak Pant*  
विभागाध्यक्ष, पर्यावरण विभाग  
Head, Department of Environmental Sciences  
हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय  
Central University of Himachal Pradesh  
अस्थायी शैक्षणिक खण्ड/Temporary Academic Block  
शाहपुर, कांगड़ा (हि.प्र.)/Shahpur, Kangra (H.P.)-176205