



## UGC-MALAVIYA MISSION TEACHER TRAINING CENTRE

(formerly known as UGC-Human Resource Development Centre)

## KURUKSHETRA UNIVERSITY KURUKSHETRA

(Established by the State Legislature Act XII of 1956)

('A+' Grade, NAAC Accredited)

**Sr. No. 1288**

### UGC-SPONSORED ONLINE MULTIDISCIPLINARY REFRESHER COURSE

### CERTIFICATE OF PARTICIPATION

This is to certify that **Dr. S.K. Chamar**, Assistant Professor of Geography, Govt. College, Julana (Jind) participated in the 2-Week Online Refresher Course in **Environment Challenges (MD)** (**An Initiative for Quality Enhancement in Teaching-Learning & Research**) from 15-01-2024 to 29-01-2024 and obtained Grade '**A**'.

Kurukshetra

Dated: 29-01-2024

(Prof. S.P. Kaushik)

Course Coordinator

(Prof. Preeti Jain)

Director

(Prof. Sanjeev Sharma)

Registrar

The grading should be as follows:

- (i) A+: 85 percent and above
- (ii) A: 70 per cent to less than or equal to 84 percent
- (iii) B: 60 per cent to less than or equal to 69 per cent
- (iv) C: 50 per cent to less than or equal to 59 per cent
- (v) F: Below 49 per cent

Those teacher participants who get F grades are required to repeat the programme after a gap of one year without financial commitment to UGC-HRDC.

The total marks are to be fixed at 100 and the same may be decided in the following manner:

- (i) Overall response - 20
- (ii) Seminars (in diverse topics mentioned in component A) - 20
- (iii) Project/survey/others (topics like climate change, environment and social connect etc.) - 20
- (iv) ICT based teaching/ MOODLE/ Micro-teaching/participation - 20
- (v) Multiple-choice objective tests -20

162

Sr. No. VCR/ETBAS/.....



Directorate of Higher Education, Haryana Approved

## Online Multi Disciplinary National Seminar

on

### Emerging Trends in Basic & Applied Sciences (ETBAS-2024)

April 24, 2024

Organized By

Faculty of Sciences & IQAC

# VAISH COLLEGE, ROHTAK

(Affiliated to M. D. University, Rohtak)



Certified that Dr./Mr./Mrs./ **Dr Nishu Gupta, Assistant Professor**

of Govt. College Julana

Participated in One Day Online Multi Disciplinary National Seminar on **Emerging Trends in Basic & Applied Sciences**

**(ETBAS-2024)** on April 24, 2024 and presented a paper titled :- An Overview of Iterative Techniques in Fixed Point Theory

**DR. VIRENDER KHURANA**  
Organizing Secretary

**DR. DINESH RANI BANSAL**  
Convener

**DR. MONIKA GUPTA**  
Convener

**DR. PHOOL SINGH YADAV**  
Co-ordinator

**DR. SANJAY GUPTA**  
Patron & Principal



# GEOGRAPHICAL SOCIETY OF HIMACHAL PRADESH

(Registered under H.P. Societies Registration Act, 2006)

## Membership Certificate

*This certificate of Membership is granted to*

Vijender Kumar (Assistant Professor)

*who has been admitted as the life member/student Member of Geographical Society of Himachal Pradesh*

*on* 17/04/2024 *in the presence of following office bearers of the society.*

(Dr. B. R. Thakur)  
Secretary General

(Prof. D. D. Sharma)  
President

Membership No. L- 221



# Geographical Society of Himachal Pradesh (GSHHP)

Department of Geography, Himachal Pradesh University

Summerhill, Shimla-171005

(Registered Under Societies Registration Act No. 25 of 2006)

**221**

## RECEIPT

No. ....

Date ... 17/04/24

Received with thanks from Prof./Dr./Ms./Mr. Vijender Kumar.....

the sum of Rupees Twenty Five Hundred Only.....

on account of Founder Member-cum-Life/Life/Ordinary (Annual)/Student (Annual)/

Honorary/Institutional Membership through Cash/online under Transaction

No. 410817284406..... of the society.

General Secretary

19/04/24

FINANCIAL SECRETARY Vishwajit Dhillon  
Geographical Society of Himachal Pradesh  
Department of Geography  
Summerhill, Shimla-171005  
Himachal Pradesh  
Secretary

Rs. 2500/-



In Honor  
of

Srinivasa Ramanujan's Birthday

## International Conference

Sponsored by  
**HSCSIT-DST**  
on

**Application of Mathematics in Physical Sciences,  
Social Sciences and Engineering - 2023**

**19-20 January, 2024**

# CERTIFICATE

This is to certify that Prof./<sup>✓</sup>Dr./Mr./Ms.

Nishu Gupta (Assistant Professor) of

Dept. of Mathematics, Govt. College, Julana

has participated/ contributed as /delivered talk /chaired session /presented

a research paper entitled Variational Inequality

Problem Involving Pseudomonotone Operators

Organized by

**Department of Mathematics**

In collaboration with

**Department of ICT**

**Chaudhary Bansi Lal University**

(A State University established under Haryana Act No. 25 of 2014) (Recognized u/s 2(f) & 12B of the UGC Act. 1956)

**Prem Nagar, Bhiwani - 127031, Haryana, INDIA**

ID ICAM-167

  
**Dr. Vinod Kumar**  
Organizing Secretary

  
**Prof. Dinesh K. Madan**  
Convener





*Two days National Conference*

*On*

Sr. No. 8.

**Research and Innovation in Sciences & Social Sciences  
( NCRISS - 2024 )**

*April 20-21, 2024*

*Organized by: Pt. NRS Government College, Rohtak - 124001, Haryana, India*

*In Collaboration with*

*Chamber of Research and Innovation India and Akhil Bhartiya Rastriya Shaikshik Mahasangh, Haryana*

**CERTIFICATE**

Certified that Prof. / Dr. / Mr. / Ms.

*Nishu Gupta*

of

*Dept. of Mathematics, Govt. College, Tulana* Chaired the Session / Delivered  
Invited talk / participated / Presented the paper Entitled *Strong Convergence of Multi-  
ple - Sets Split Equality Common Fixed Point Problem in NCRISS-2024.*

*Lokesh*

*(Dr. Lokesh Balhara)*  
Patron / Principal

*(Dr. R.K. Dahiya and Dr. Parvesh Kumar)*  
Convenor



# GURUGRAM UNIVERSITY, GURUGRAM

(A State Govt. University Established under Haryana Act 17 of 2017)

## DEPARTMENT OF MATHEMATICS

organises

## NATIONAL SEMINAR

on

# "Recent Developments in Mathematical Sciences and Applications" (NSRDMSA - 2024)

S.No. NS06

## Certificate of Participation

This is to certify that Dr./Ms./Mr. *Nishu Gupta* from *Govindram College*  
*Sikara, Ind.* has participated and presented a Paper (Oral/Poster) entitled *Convergence Analysis*  
in the *Paint. Problem* National Seminar on "Recent Developments in Mathematical Sciences and Applications"  
held on 1<sup>st</sup> March, 2024 at Department of Mathematics, Gurugram University, Gurugram, Haryana.

Convener

**Prof. Renu Chugh**

Department of Mathematics,  
Gurugram University, Gurugram

Chairperson

**Prof. Mohd. Rafique**

Department of Mathematics,  
Gurugram University, Gurugram





# DYAL SINGH COLLEGE, KARNAL

(Affiliated to Kurukshetra University, Kurukshetra)  
(NAAC Accredited Grade A+)



Indian Council of Social Science Research (NWRC), Chandigarh Sponsored  
Director General Higher Education, Haryana Approved  
National Conference

23<sup>rd</sup> Association of Punjab Geographers Meet on  
Environment and Resource Management for Sustainable Future  
(February 09-10, 2024)

## Certificate

This certificate is presented to Prof./Dr./Mr./Ms.

*SK Chaman*

of

*Government College Tulana Jind (Haryana)*

in recognition to the valuable contribution as

**Chief Guest / Guest of Honour / Invited Speaker /  
Session Chairperson / Co-Chairperson / Special Invitee**

*Aditi*

Dr. Aditi Shreeya Bali  
(Organizing Secretary)

*Dr. Tejpat*  
(Convener)

*Aakhar*

Dr. Ashima Gakhar  
(Patron & Principal)







**Indian Council of Social Science Research (NWRC), Chandigarh Sponsored  
&  
Director General Higher Education, Haryana Approved  
National Conference  
&  
23<sup>rd</sup> Association of Punjab Geographers Meet  
on  
ENVIRONMENT AND RESOURCE MANAGEMENT  
FOR SUSTAINABLE FUTURE  
(09<sup>th</sup> & 10<sup>th</sup> February, 2024)**



**Jointly Organized by the Department of Geography & Botany  
DYAL SINGH COLLEGE, KARNAL (HARYANA)  
(NAAC Accredited A+ Grade)**

# Association of Punjab Geographers

(Registered under Societies Registration Act, XXI of 1860, No. 1902 of 1998-99)

## Executive Committee (2022-23 & 2023-24)

Chief Patron:

Dr. H.S. Mangat (Patiala)

Patron:

Dr. M.S. Jaglan (Kurukshetra)

President:

Dr. Anuradha Sharma (Jammu)

Outgoing President:

Dr. Dharam Singh Sandhu (Ludhiana)

President Elect:

Dr. S.P. Kaushik (Kurukshetra)

Vice Presidents:

1. Dr. K.V. Chamar (Rohtak)

2. Dr. Gaurav Kalotra (Chandigarh)

3. Dr. V. K. Bhardwaj (Jaipur)

General Secretary:

Dr. Lakhvir Singh Gill (Patiala)

Joint Secretary:

Dr. Monika Kannan (Ajmer)

Finance Secretary:

Dr. Shaik Iftikhar Ahmed (Chandigarh)

Press & Publicity Secretary:

Dr. Jaspal Singh (Mohali)

Executive Members:

1. Dr. Navneet Kaur (Chandigarh)

2. Dr. B.C. Jat (Jaipur)

3. Dr. Inder Jeet Singh (Jammu)

4. Dr. Ram Lal (Shimla)

5. Dr. Pritam Chand (Bathinda)

6. Mr. Navjot Singh Billing (Patiala)

7. Dr. Jagseer Singh (Bathinda)

8. Dr. Tajinder Kaur (Jammu)

Ex. Officio Members:

Editor, Punjab Geographer

Dr. H.S. Mangat

Managing Editor, Punjab Geographer

Sh. Jaswant Singh

Associate Editor, Punjab Geographer

Dr. Omvir Singh

Editor, Geographers' Newsletter

Dr. Jaspal Singh

Coordinator, Meritorious Student Award

Dr. Anuradha Sharma

Coordinator, Young Geographer Award

Dr. Inder Jeet Singh

Coordinator, Promising Geographer Award

Dr. Vishwa B. S. Chandel

Coordinator, Inter-State Geographical Quiz

Dr. Manoj Kumar Jangra

Please contact if you have any queries regarding conference:

E-mail: [apgconference2024@gmail.com](mailto:apgconference2024@gmail.com)

Phone: +91-9416912640; +91-9646647342; +91-9996220010

## About the Association of Punjab Geographers

The Association of Punjab Geographers (APG) is a national organization, registered under the Societies Act of 1860, No. 12 of 1989-99. At present, it has 592 life members from all over India, including a few members from abroad. APG is striving for the promotion of teaching in Geography at the level of schools, colleges and universities. It encourages applied research addressing the problems of the society which fall within the scope of Geography. To achieve these goals, it has instituted the 'Young Geographer Award', 'Promising Geographer Award' and publishes quality research journal 'Punjab Geographer' indexed in SCOPUS. APG also publishes 'Geographers Newsletter' a bi-annual publication for disseminating geographical information and awareness. It also felicitates distinguished geographers in recognition of their specific achievements and services to the society.

APG organizes its annual meet in the form of a national/ international conference in collaboration with Geography departments of various Universities/ Colleges to deliberate on the issues falling within the ambit of Geography. To generate environmental awakening among the children, APG regularly runs programmes such as plantation in schools, arranging special lectures, painting contests, teaching of Geography contests, model making, photography contests etc. APG also organizes Inter-state Geography Quiz Contest for undergraduate and postgraduate students from Punjab, Haryana, Himachal Pradesh and Jammu province.

## About the City

Welcome to Karnal, a city of agricultural splendor and cultural richness nestled in the heart of Haryana, India. The city is a dynamic blend of tradition and modernity. Karnal is a thriving education hub, home to prestigious research institutes like the National Dairy Research Institute (NDRI), Central Soil Salinity Research Institute (CSSRI) and Central Institute for Research on Buffaloes (CIRB) etc. This abundance of educational resources further enriches the city's intellectual landscape, providing a conducive environment for learning and research. In February, Karnal enjoys a delightful climate, with temperatures ranging from around 10°C to 22°C. The days are pleasantly sunny, and the nights are crisp and cool, making it an ideal time for outdoor activities and exploration. As you immerse yourself in the city's bustling markets, indulge in delectable local cuisine, and interact with the warm and hospitable residents, you'll experience Karnal's unique charm, where tradition meets progress. Karnal boasts excellent air connectivity, thanks to its proximity to



Chandigarh, the capital city of Haryana and Delhi, the National Capital. Nestled just 125 kilometers from Chandigarh and Delhi, Karnal is a city that promises seamless connectivity. With its strategic location on the Grand Trunk Road, Karnal ensures easy access from every corner of the country. The city's well-efficient rail transport system adds another layer of convenience, making your journey comfortable and hassle-free. We invite our esteemed delegates to enjoy the National Conference amidst Karnal's soothing February climate, leaving you with unforgettable memories of this vibrant city.

## **About the College**

Dyal Singh College, Karnal, the only NAAC accredited Grade A+ and ISO 140001 & 9001 certified College in the city, is celebrating its 75<sup>th</sup> glorious year of excellence in education marking a remarkable milestone with pride and achievement. From its humble beginnings to becoming a beacon of knowledge and empowerment, the college has come a long way, shaping countless lives and leaving an indelible mark on the educational landscape of Karnal city. Founded in 1910 at Lahore in Pakistan, the college was reestablished at Karnal in 1949 after partition of India. Dyal Singh College is embarking on a mission to provide quality education and holistic development opportunities to the youth of Karnal and its neighboring regions. Over the past seven and a half decades, this premier co-educational centre of learning has stood tall as a symbol of academic brilliance, fostering a nurturing environment where students are encouraged to explore, learn, and grow. The college has all the three streams of learning-Arts, Science and Commerce, with Master Courses in English, Hindi, Political Science, Chemistry and Commerce, 5-year Integrated Course M. Sc Forensic Science along with the add-on and vocational courses.



## **Thrust Area of the Conference**

The two-day National Conference on "Environment and Resource Management for Sustainable Future" is aimed to serve as a comprehensive platform for knowledge sharing, fostering awareness, and encouraging collaborative efforts in the realm of environmental sustainability and resource management. The conference is designed to bring together researchers, scholars, and experts from various fields, providing them with an opportunity to disseminate their research findings and insights related to pressing environmental issues. One of the primary objectives is to raise awareness about critical challenges such as climate change, pollution, and resource depletion, both among the general public and decision-makers. Through networking opportunities, the conference will facilitate valuable interactions, allowing professionals and researchers to forge collaborations, share innovative ideas, and establish meaningful academic and professional relationships.

Furthermore, the event is aimed to contribute to policy development by hosting discussions and proposing strategies for sustainable environmental management and resource conservation. Emphasizing an interdisciplinary approach, the conference will encourage dialogue between professionals from diverse fields, promoting a holistic understanding of complex environmental issues. Technical sessions will be organized to identify practical solutions, inspiring attendees to take proactive measures in their respective spheres towards environmental conservation and sustainable resource management. Overall, the conference will serve as a source of inspiration, encouraging positive actions and initiatives that may contribute to building a more sustainable future for all.

## **Focal Theme of the Conference**

Environment and Resource Management for Sustainable Future

### **The sub-themes**

- Geospatial technology in Resource Management and Planning
- Sustainable Management of Mountains and Coastal Resources
- Conservation of Natural Resources
- Biodiversity and Sustainable Environment
- Developing Resilience towards Climate Change
- Tourism and Livelihood
- Population and Urbanization-Emerging Trends



- Gender Issues and Challenges
- Blending Traditional and Modern Techniques for Sustainable Agriculture
- Decentralization and People's Participation for Inclusive Development

## Call for Abstracts/ Papers

Researchers are cordially invited to submit their abstracts for presentation during the conference on any sub-theme and related issues. The abstract must be written in MS Word document (A4 size), Arial, 12 font size, and 1.15 line spacing without inserting any special symbol, formula, diagram, table, or reference. The abstract should clearly indicate the research problem, methodology, and the key findings of the work within 400 words. A sample template of the abstract can be downloaded from the given link: <https://bit.ly/3FfNBIN>.

Files sent through email or by any other means will not be considered. To prevent multiple submissions of the same abstract, only the corresponding author should submit one. If an abstract is contributed by more than one author and the non-presenting author also registers for the conference, he/ she will be automatically mapped to the abstracts co-authored. All abstracts will be reviewed by the organizing committee and may be sent back for revision if required. If a revision is necessary, the revised abstract must be sent back within a week. Participants are requested to fill up the registration form and send the same along with the abstract and the registration fee latest by January 15, 2024 using the given link for the registration: <https://forms.gle/Hzj7jnGSMSYw9QGJA>. Abstracts submitted without the registration fee and after last date (January 15, 2024) will not be included in the conference souvenir. A person attending the conference without an abstract can directly proceed with registration & payment. The persons' status will be of attendee only. If you face any problem in abstract submission, feel free to send your query and abstract on the mail: [apgconference2024@gmail.com](mailto:apgconference2024@gmail.com).



## Registration Fees

### Payable Amount (INR)

Category	Host Fee	APG Fee	Total** (without late Fee)	Total (with late Fee)
General Delegates/ Local Participants*	1000/-	300/-	1300/-	1500/-
Research Scholars	700/-	300/-	1000/-	1200/-
Accompanying Persons	1000/-	-	1000/-	1200/-
Students	500/-	-	500/-	500/-
Senior Delegates (Above 65 Age)	-	-	-	-

\*Accommodation will not be provided to the local participant

\*\*Last date of submitting registration fee is January 15, 2024.

The participants can get themselves registered online by paying registration fee (all inclusive) in **A/C No. 55002451840; Name of Account Holder 'Dyal Singh College Trust Society'; Name of the Bank: State Bank of India; Branch Name: Dyal Singh College Branch, Karnal-Haryana; Branch Code: 50637 and IFSC Code: SBIN0050637.** The receipts of registration fee (Host + APG share) will be issued at the time of registration. Non-Paid research scholars & UG/PG Students are exempted from APG share of registration on the recommendation of respective head of the department. Senior Delegates (Above 65 Age) will be the honorable guests of the college and no fee will be charged from them. Registration fee includes participant kit, entry to all sessions, both boarding and lodging and participation certificate charges. Late fee of Rs. 200/- is applicable after January 15, 2024. Spot registration is also available on February 09, 2024, only to attend the conference. There is no provision for refunding the registration fees.

### **Accommodation**

The delegates in need of accommodation must write/ email to the convener along with the proof of registration fee before January 25, 2024 to enable the organizers to make arrangements. Accommodation will be provided on sharing basis. On the spot request for accommodation may create inconvenience both for the participants and organizers. Hence, no request for accommodation, on the spot or after January 25, 2024, will be entertained by the organizers. After January 25, 2024, participants will have to arrange for accommodation themselves at their own expense.

### **Important Dates**

- January 15, 2024** : Deadline for submission of abstract and deposit of registration fee without delay. Thereafter, late fee will be charged and the abstract will not be included in the souvenir.
- January 15, 2024** : Deadline for submission of paper for the Young Geographer Award competition and poster for the Promising Geographer Award competition.
- January 20, 2024** : Acceptance of Abstract
- January 25, 2024** : Deadline for information regarding accommodation
- February 9-10, 2024** : Conference dates

## Publication of Proceedings

The organizers intend to publish the proceedings just after the conclusion of the conference. Therefore, delegates are requested to submit full paper to the convener by February 15, 2024. The manuscript, tables and figures must be in the format as prescribed for 'Punjab Geographer' journal using the guidelines for the authors mentioned in the Journal, which can be downloaded by scanning this QR code. Presentation of the paper on the conference does not provide the right for publication. Selection of the paper depends on its quality check by the editorial team. The papers and posters received for award competition will also be considered for publication in the proceedings.



## Dr. Saminderjit Singh Memorial Young Geographer Award

Original research papers, along with bio-data of the authors who have done Masters' in Geography and have not attained the age of 32 years, are invited from all over India and SAARC countries for the Young Geographer Award competition. A soft copy of the paper prepared according to the guidelines for the authors of 'Punjab Geographer' should be submitted in English to **Dr. Inder Jeet Singh, Assistant Professor, Department of Geography, University of Jammu, Jammu (E-mail: [indergeog.ju@gmail.com](mailto:indergeog.ju@gmail.com), Mob: 9906007392)**, with a copy to **Dr. Lakhvir Singh Gill, General Secretary, Association of Punjab Geographers (Email: [generalsecretaryapg@gmail.com](mailto:generalsecretaryapg@gmail.com) Mob: 9814928741)**. The name of the author and department should not be mentioned on the paper, but in the covering letter, to keep secrecy. Evaluation and competition will take place only if there are at least six participants. The paper must accompany a proof of age and a certificate about the originality of the paper. The winner will be awarded a cash prize of Rs. 3000/- and first runner up with a cash prize of Rs. 2000/- along with certificates. The award money will be adjusted towards Life Membership if the participant is not a member of the APG. The papers received later than January 15, 2024 will not be considered for evaluation. It is mandatory on the part of the participants to submit the certificate of date of birth and Masters' degree in Geography at the time of submission of the paper to the coordinator. For detailed rules and research paper format, please visit: [www.apgorg.org](http://www.apgorg.org). The competition will take place in a special session of the 23<sup>rd</sup> APG Meet and National Conference being organized by Dyal Singh College, Karnal, Haryana on February 9-10, 2024.

## **Prof. B. Hema Malini Promising Geographer Award**

Under this award, Poster Presentation Competition is organized on the themes of the conference. Young Geographers, who have done Masters' in Geography and have not attained the age of 28 years, are invited from all over India and SAARC countries for the Promising Geographer Award competition. The aspirants of this award shall submit soft copies of their original posters along with bio-data in English to coordinator of this award, Dr. Vishwa B.S. Chandel, Assistant Professor, Department of Geography, Panjab University, Chandigarh, (**E-mail: [vishwa.geoinvader@gmail.com](mailto:vishwa.geoinvader@gmail.com). Mob: +91- 9872833637**), with a copy to Dr. Lakhvir Singh Gill, General Secretary, Association of Punjab Geographers (**E-mail: [generalsecretaryapg@gmail.com](mailto:generalsecretaryapg@gmail.com) Mob: 9814928741**). The winner will be awarded with a cash award of Rs. 3000/-, the first runner-up Rs. 2000/- and the second runner-up Rs. 1000/- respectively along with certificates. The Award money will be adjusted towards Life Membership if the participant is not a member of the APG. The posters received later than January 15, 2024 will not be considered for evaluation. It is mandatory on the part of the participant to submit the certificate of date of birth and Masters' degree in Geography at the time of submission of the poster to the coordinator. For detailed rules and guidelines, please visit [www.apgorg.org](http://www.apgorg.org). The competitors will have to display their posters on the space provided for it on 23<sup>rd</sup> APG Meet and National Conference being organized by Dyal Singh College, Karnal, Haryana on February 9-10, 2024.

### **APG Meeting**

A joint meeting of the Executive Committee of the Association of Punjab Geographers and the Editorial Board of 'Punjab Geographer' will take place in the Library, Dyal Singh College, Karnal, Haryana on February 9, 2024, at 6:00 pm. All the members are requested to attend the meeting. The agenda of the meeting will be circulated by the General Secretary well in advance. General Body meeting will also take place just after the Valedictory Session of the conference on February 10, 2024, to apprise and discuss with the members the decisions taken by the Executive Committee in its meeting held on February 9, 2024. All the members of APG are requested to attend the meetings.



# Organizing Committee

## Patron

**Dr. Ashima Gakhar**

Principal, Dyal Singh College, Karnal

## Advisory Committee

**Ms. Manishaa Sharma**

**Sh. Sanjay Kumar**

**Sh. Rajpal**

## Convener

**Dr. Tejpal**

(+91-9416912640)

## Organizing Secretary

**Dr. Aditi Shreeya Bali**

(+91-9646647342)

## Treasurer

**Dr. Dimple Khosla**

(+91-9996220010)

## Members of Organising Team

**Dr. Usha Rani**

**Ms. Nikita Arya**

**Ms. Jyoti**

**Ms. Isha**

**Dr. Amanpreet Kaur Kalsi**

**Ms. Arpita Sawhney**

**Dr. Suhana Rao**

**Sh. Deepak Kumar**

**Sh. Kiran Kumar**

**Mr. Anil Kumar**

**Ms. Sonal Saluja**

**Dr. Chanchal Gupta**

## Important Links

Registration Form: <https://forms.gle/Hzj7jnGSMSYw9QGJA>

Abstract Template: <https://bit.ly/3FfNBIN>

Our website: [www.dsckarnal.ac.in](http://www.dsckarnal.ac.in)

APG Website: [www.apgorg.org](http://www.apgorg.org)



Please contact if you have any queries:

E-mail: [apgconference2024@gmail.com](mailto:apgconference2024@gmail.com)

Phone: +91-9416912640; +91-9646647342; +91-9996220010





**The Deccan Geographical Society of India (DGSi)**



**XVIII International Conference  
On**

**Urbanisation and Climate Change:  
Strategies for Sustainable Cities through Geospatial Technologies**

**(5<sup>th</sup> – 7<sup>th</sup> March, 2024)**

**Organized By**

**Department of Geography, University College of Science,  
Osmania University, Hyderabad, Telangana, India- 500007**

**Call for Abstracts**

**Visit - <https://www.18dgsi2024.com>**



**Chief Patron**

**Prof. D. Ravinder**

**Hon'ble Vice- Chancellor, Osmania University, Hyderabad, India**

**Patron**

**Prof. P. Laxminarayana, Registrar  
Osmania University, Hyderabad, India**

**Co-Patron**

**Prof. B. Reddy Naik, OSD to VC  
Osmania University, Hyderabad, India**

**Convener**

**Prof. Ashok Kumar Lonavath  
Head, Department of Geography &  
Joint Director, PGRRCDE,  
Osmania University, Hyderabad, India**

**Organizing Secretary**

**Dr. Mohd Akhter Ali  
Assistant Professor &  
Joint Director, Directorate of Admissions  
Osmania University, Hyderabad, India**

**Venue**

**Prof. G. Ram Reddy Centre for Distance Education (PGRRCDE)  
Osmania University, Hyderabad-500 007**

## About Hyderabad

Hyderabad, located in southern India, is the capital of Telangana. With a rich historical heritage dating back to its founding in 1591, Hyderabad is a city of contrasts, blending its ancient traditions with modernity. Often referred to as the "City of Pearls" for its historical role in the pearl and diamond trade, Hyderabad is celebrated for its vibrant culture and distinctive cuisine, notably the world-famous Hyderabadi Biryani. In recent years, it has evolved into a prominent Information Technology (IT) and technology hub, with HITEC City at its core, fostering rapid economic growth and attracting professionals from around the world. The city's landscape is adorned with iconic landmarks like the Charminar and Golconda Fort, while its thriving sectors encompass IT, pharmaceuticals, biotechnology, manufacturing, and the film industry. Hyderabad's transportation network, including the Hyderabad Metro, is well-developed, making it a major economic and cultural centre in India. Tourism is another significant aspect of Hyderabad, drawing visitors to explore its historical sites and experience cultural festivals. The city's linguistic diversity includes Telugu, Urdu, and English, fostering an inclusive atmosphere. Hyderabad's dynamic blend of tradition and progress has solidified its position as a prominent cultural, economic, and technological hub in India, offering a fascinating environment for both residents and visitors.



## About Osmania University



Osmania University, located in Hyderabad, India, is a venerable institution with a storied history dating back to its founding in 1918 by the Seventh Nizam of Hyderabad, Mir Osman Ali Khan. This esteemed university has played a pivotal role in shaping the educational and cultural landscape of India. It offers a wide spectrum of undergraduate, postgraduate, and doctoral programs across various academic disciplines. The university's expansive and picturesque campus is adorned with iconic structures, including the Arts College building, and serves as a hub for academic excellence and research innovation. Osmania University's commitment to research and holistic development is evident through its vibrant cultural and extracurricular activities, fostering a diverse and inclusive learning environment. Diversity thrives within Osmania University, attracting students from diverse backgrounds, regions, and nations. Its alumni network includes influential figures in politics, literature, science, and entertainment who

have made substantial contributions to society. The institution's emphasis on global collaborations and community engagement underscores its commitment to broader societal impact. Osmania University, with its rich history and unwavering dedication to academic excellence, continues to be a prominent beacon of learning, research, and cultural enrichment in India's educational landscape.

## About Geography Department

The Department of Geography is one of the oldest and also the largest in South India. It was established in 1942. It offers M.Sc. Geography, M.Sc. Geoinformatics, Post-Graduate Diploma in Geographical Cartography and Ph.D. programs. The Department had assistance from UGC (SAP and ASIST) and DST (FIST Phase I and II). The Department has been conferred with the status of Centre for Advanced Study (CAS). Its thrust areas are Urban Geography, Regional Development and Geoinformatics. Academic programmes and publications have been undertaken with institutions in India and abroad particularly in the field of urban geography and Geoinformatics. Moreover, the department typically maintains state-of-the-art research facilities, including GIS laboratories and remote sensing equipment, which are instrumental in both teaching and research activities. Collaborations with governmental and non-governmental organizations are common, allowing the department to engage in research projects with real-world applications, such as urban planning, environmental conservation, and disaster management.



## About Deccan Geographical Society of India (DGSI)

The Deccan Geographical Society of India was established in 1962. It has been publishing an International Geographical Journal, namely, "The Deccan Geographer" since 1962. The journal has an international registration number, ISSN-0011-7269. Every year two issues of the journal (June and December) are published and circulated among 1000 life members, 700 libraries in India, and 29 countries in the world. The special issues have been published by DGSI on Historical Geography (1992), Index Volume (2000), and Climatology (1997). Besides, the Society started a new Journal, namely, Bhugol Shastra Sanshodhak in 2006. The membership is open to geographers, planners, and scientists belonging to allied disciplines.



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## About Conference

Urbanization and climate change are pressing global challenges, and a geoinformatic approach offers crucial strategies for fostering sustainable cities that can thrive amidst these issues. By harnessing the power of geographic information systems (GIS), remote sensing, and data analytics, cities can make informed decisions and effectively mitigate environmental impacts. Geospatial tools enable urban planners to analyze land use patterns, promote smart growth, and enhance energy efficiency through audits and renewable energy mapping. Transportation planning benefits from geospatial insights, reducing congestion and emissions, while urban green spaces, waste management, and water resources can be optimized for sustainability. Moreover, geoinformatics aids in climate adaptation and community engagement, facilitating data sharing, visualization, and comprehensive monitoring. This holistic approach empowers cities to navigate the complex nexus of urbanization and climate change, creating resilient, environmentally responsible urban environments that prioritize the well-being of their residents. The goal of the seminar "Urbanisation and Climate Change: Strategies for Sustainable Cities, through geospatial technologies" is to convene experts, policymakers, and stakeholders to raise awareness about the critical intersections of urbanization and climate change, showcasing how geoinformatics can be employed to develop sustainable urban solutions. Through knowledge sharing, interdisciplinary collaboration, and innovative geospatial technologies, the seminar aims to empower decision-makers, engage communities, and advocate for policies that foster resilient, environmentally responsible urban environments, ultimately contributing to the global effort to address the challenges posed by urbanization and climate change while prioritizing the well-being of urban populations.

## Sub Themes

- |                                 |                                  |                                 |   |
|---------------------------------|----------------------------------|---------------------------------|---|
| 1.Urban Geography               | 7.Demographic studies            | 13.Ocean Studies                | 19.GPS & GNSS Applications              |
| 2.Urban & Regional Planning     | 8.Regional Development Studies   | 14.Disaster Management studies  | 20.Cartographic studies                 |
| 3.Agricultural geography        | 9.Rural Development and Planning | 15.Geopolitics                  | 21.Digital Image Processing             |
| 4.Economic Geography            | 10.Tourism Geography             | 16.Remote Sensing Application   | 22.Drone Application in Spatial studies |
| 5.Environment Geography         | 11.Geomorphology                 | 17.GIS Application in Geography | 23. Any other branch of Geography       |
| 6.Social & Population Geography | 12.Climatical studies            | 18.Photogrammetry               |   |

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Login to <https://18dgsi2024.com> for submission of abstract.

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Payment of registration fee is compulsory before final acceptance of the abstract and receiving invitation letter from the convener, Only the accepted abstracts with full payment of registration fee will be published in conference abstracts volume.

The author should submit Full paper before 10th February 2024 at Email [dgsi2024osmania@gmail.com](mailto:dgsi2024osmania@gmail.com). (The full paper should have an Introduction, Objectives, Hypothesis, Study Area, Methodology, Numbered side headings, Results, Findings, Conclusions, References & Font - Times New Roman, Font Size - 12 No. and Line Spacing 1.5, Word format).

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## Important Dates

Conference Dates	:	<b>5<sup>th</sup> to 7<sup>th</sup> March, 2024</b>
Last date of abstract submission	:	<b>10<sup>th</sup> February, 2024</b>
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Date: 18/01/2024

Place: UGC-MM-TTC, University of North Bengal.

(Prof. Anjan Chakrabarti)  
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Date: 18/01/2024

Place: UGC-MM-TTC, University of North Bengal.

(Prof. Anjan Chakrabarti)  
Professor - Director, (MM-TTC)



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This certificate is given to the individual from **Government College Julana (Jind)** for his/her participation in workshop regarding National Institutional Ranking Framework (NIRF) on 26th of December, 2023, Organized by Haryana Statistical Cell, Directorate Higher Education, Panchkula -Haryana



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Postgraduate College, Lead City University Ibadan, Nigeria

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Diversity & Inclusion: Driving force to Innovation for Sustainable Development

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प्र. क्र. JIN-282089

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**in association with : Society for Pathways to Sustainability**



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(54) Title of the invention : SYSTEM AND METHOD FOR PREDICTIVE ANALYSIS OF LITERARY WORKS FOR ECONOMIC AND STATISTICAL INSIGHTS

(51) International classification : G06N002000000, G06N0005040000, G06N0005020000, G06N0007000000, G06F0017180000

(86) International Application No : NA  
 Filing Date : NA

(87) International Publication No : NA

(61) Patent of Addition to Application Number : NA  
 Filing Date : NA

(62) Divisional to Application Number : NA  
 Filing Date : NA

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 3) Dr. Pallavi Arya  
 4) Dr. Bhawana Sharma  
 5) Dr. Mohit Sharma  
 6) Dr. Vipin Mittal  
 Name of Applicant : NA  
 Address of Applicant : NA

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3) Dr. Pallavi Arya  
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4) Dr. Bhawana Sharma  
 Address of Applicant : Assistant Professor, Department of Computer Science, Govt. College Chhachhrauli, Yamunanagar, Haryana, India. Yamunanagar -----

5) Dr. Mohit Sharma  
 Address of Applicant : Assistant Professor, Department of Computer Science & Engineering, NIILM University, Kaithal, Haryana, India. Kaithal -----

6) Dr. Vipin Mittal  
 Address of Applicant : Director, IJRTS Takshila Foundation, Jind, Haryana, India. Jind -----

(57) Abstract :  
 SYSTEM AND METHOD FOR PREDICTIVE ANALYSIS OF LITERARY WORKS FOR ECONOMIC AND STATISTICAL INSIGHTS  
 ABSTRACT There have never been more chances to draw statistical and economic conclusions from literary works than in the modern digital era, thanks to the merging of literal and data science. Predictive analysis of literary texts to extract significant economic and statistical information is presented in this invention along with a related computing system and a systematic framework. To analyze large literary corpora, our method employs methods for natural language processing (NLP), machine learning, and statistical modelling. When it comes to constructing and testing hypotheses that entail describing, predicting, or explaining a causal link, statistical modelling is a beneficial technique that can be utilized. The idea that models with significant explanatory capacity are likewise effective predictors is widely held in a variety of fields, particularly those in which statistical modelling is largely utilized to explain causal linkages. Occasionally, individuals confuse explanation with prediction. This takes place in certain situations. There are a great number of variables that come into play when performing models with an explanatory rather than a predictive objective; yet, the statistical literature does not contain any comprehensive examinations of these variables. In spite of the fact that statisticians have failed to fully address this issue, philosophers of science have acknowledged its existence. In this invention, we will examine the distinctions between explanatory and predictive modelling, as well as the origins of these differences and the ways in which they impact each stage of the modelling process in a practical sense.

No. of Pages : 14 No. of Claims : 7



Ph. : 01681-256263

Email : [hkmvjind@gmail.com](mailto:hkmvjind@gmail.com)

Website : [www.hkmvjind.com](http://www.hkmvjind.com)

# HINDU KANYA MAHAVIDYALAYA

Jind-126102 (HARYANA)

(Affiliated to C.R.S.U., Jind)

(A Post Graduate College Aided by Haryana Govt.)

Ref. No. ....5958.....

Dated ....05-12-2023.....

To  
Dr. Neha Mittal  
Assistant Prof. of Mathematics  
Govt. College  
Julana

Subject: Thanks Letter

Respected Madam,

It gives me immense pleasure to express my deep sense of gratitude towards you for acting as Resource Person in one day Extension Lecture on "Career in Mathematics" organized by Department of Mathematics and Career Counselling & Placement Cell, Hindu Kanya Mahavidyalaya, Jind on 5<sup>th</sup> December, 2023. The program becomes successful with your kind cooperation.

I do hope your cooperation and help in future too. We hope that your career is full of success and happiness.

Warm regards

*Sar  
Hinde*

Principal  
Hindu Kanya Mahavidyalaya  
Jind (Haryana)





Dr. Neha Mittal  
Assistant Professor in Mathematics.,  
Govt. College Julana,  
Jind, Haryana, India,-126101



Ref. No.: IAJESM/2023/OCT/002

Dated: 11/10/2023



**International Journal of  
Engineering, Science and  
Management (ISSN: 2393-8048)**

I A J E S M

### FORMAL LETTER FOR EDITORIAL BOARD MEMBER

**Dear Dr. Neha Mittal,**

We would like to take the pleasure to declare you as an Editorial Board Member on behalf of Science journal. Based on your eminence and expertise in the fields of Mathematical Sciences, the Editorial Office has decided to elect you as an Editorial Board member with a strong belief that your professionalism will be a great asset for the journal. As you are sitting on the most important throne of the journal, your active involvement and participation plays a crucial role to propel Science to great heights.

As the journal is open access, your valuable contribution is very essential for the journal. As an Editorial Board member, I hope you will meet all the criteria of Science. We heartily honour you with the prestigious position of Editorial Board member for Science.

Thank you!  
With Kind Regards,

#### **CONTACT**

PHONE:  
+91 98280 15814

WEBSITE:  
iajesm.in

EMAIL:  
[iajesm2014@gmail.com](mailto:iajesm2014@gmail.com)  
[2014.iajesm@gmail.com](mailto:2014.iajesm@gmail.com)

  
Dr. Aruna Nagpal,  
Proprietor,  
SEA, Sri Ganganagar

  
Dr. Ashwini Kumar Nagpal  
Chairperson  
IAJESM





# IJRTS TAKSHILA FOUNDATION

Company # RU80902HR2022NPL104244

## IJRTS Takshila Foundation

**Registered Office:** SCF# 10, Opposite DRDA, Near Gohana Road, Jind, Haryana-126102

**Corporate Office:** 71-75 Shelton Street, Covent Garden, London WC2H 9JQ ENGLAND

9468162387 | 9034020313 | 8818001872 | 9350893768

Ref. No: ijrts/bt/ne/23/72

Jind, dated 22.09.2023

To,

Dr. Neha Mittal d/o Smt. Sumitra Devi r/o 313, Housing Board Colony, Jind, Haryana, India

Referring to your letter relating to registration of publication(s) under ISBN system for the title(s) and allotted ISBN's numbers are as under:

### 1. Title: Current Trends in Statistics & Research

Chief Editor/ Author(s)	Dr. Neha Mittal
Edition	First
Volume	01
Month/Year of Publication	September, 2023
Book Version	PaperBack, Digital download
Product Composition	Multiple-component Retail Product
ISBN Number	978-81-964047-7-2
Subject	Multidisciplinary
Language	English/Hindi/Sanskrit
Imprint	IJRTS Publications
Copyright	Dr. Neha Mittal
ID Details	9781 0483 6360 (Aadhar Number)

### 2. Nill

You will be provided with a complimentary copy of each ISBN title under the imprint of IJRTS Publications.

Thanking you.

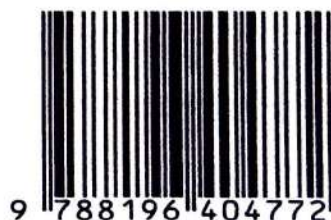
Yours faithfully,



Director, IJRTS Takshila Foundation



22 SEP 2023



9 788196 404772

+91-946 8162 387

ijrts13@gmail.com

www.takshila.org.in

SCF#10, Mittal Complex, Opposite DRDA, Jind, Haryana



Teaching Learning Centre, Ramanujan College  
University of Delhi

(Accredited Grade 'A++' by NAAC)

In collaboration with

MAHARAJA SURAJMAL INSTITUTE

(Aff. to GGS Indraprastha University, Delhi)

Institute under the aegis of Surajmal Memorial Education Society (SMES, 1972)

Rated as Category 'A+' by SFRC & 'A' by JAC Govt. of NCT of Delhi

Approved by BCI & AICTE And Recognised U/s 2(f) of UGC Act

under the aegis of

MINISTRY OF EDUCATION

PANDIT MADAN MOHAN MALAVIYA NATIONAL MISSION ON TEACHERS AND TEACHING



सत्यमेव जयते

Ministry of Education  
Government of India

This is to certify that

**Dr. Neha Mittal**

of

Department of Mathematics, Govt. College Julana, Jind, Haryana, India

has Successfully Completed online two - week Interdisciplinary Refresher Course in

**"ADVANCED RESEARCH METHODOLOGY"**

from 22 September – 06 October, 2023 and obtained

Grade A+.



Blockchain Hash: [0x87662016fd8be5d49cb86dbbfa2a86837bdc2ea6cf9281f45383bfcc196b0b](https://www.blockchain.com/transaction/0x87662016fd8be5d49cb86dbbfa2a86837bdc2ea6cf9281f45383bfcc196b0b)

Prof. S. P. Aggarwal  
(Principal & Director)  
TLC, Ramanujan College

Prof. (Dr.) Harish Singh  
(Director)  
Maharaja Surajmal Institute

Dr. Nikhil Kr. Rajput  
(Deputy Director)  
TLC, Ramanujan College





# The Deccan Geographical Society of India (DGSII)

## XVIII International Conference

(5<sup>th</sup> – 7<sup>th</sup> March, 2024)

Department of Geography, Osmania University, Hyderabad

Regd Id: 452 DGSII/OU/2024

### Certificate

This is to certify that Dr. / Mr./ Ms. Dr. S.K. CHAMAR of \_\_\_\_\_

has participated and Presented paper on Levels in Availability

of Household Amenities & Access among scheduled castes & Non-scheduled <sup>castes groups in Rural Haryana.</sup> XVIII DGSII International

Conference on “Urbanisation and Climate Change: Strategies for Sustainable Cities through Geospatial Technologies”

Organised by the Department of Geography, Osmania University, Hyderabad, Telangana State, during 5-7 March 2024.

  
**Dr. Mohd Akhter Ali**  
Organizing Secretary

  
**Prof. B. C. Vaidya**  
Secretary General, DGSII

  
**Prof. Ashok Kumar Lonavath**  
Convener & Chairman





क्षमता निर्माण आयोग  
मिशन कर्मयोगी

75  
आज़ादी का  
अमृत महोत्सव



# हरियाणा कर्मयोगी कार्यक्रम

प्रमाण पत्र

प्र. क्र. JIN-282113

यह प्रमाण पत्र विधिवत स्वीकार करने के लिए जारी किया जाता है कि श्री/श्रीमती/सुश्री **Sahil** ने मिशन कर्मयोगी के तहत हरियाणा कर्मयोगी कार्यक्रम को सफलतापूर्वक पूरा कर लिया है। हरियाणा कर्मयोगी के रूप में आपकी यात्रा के लिए हम शुभकामनाएँ देते हैं।

*Shrinivas V*

श्रीनिवास वेंकटराम,  
संस्थापक और नेतृत्वकर्ता, इल्युमिन



*चंद्रलेखा*

चंद्रलेखा मुखर्जी,  
महानिर्देशक, हिपा





UGC-MALAVIYA MISSION TEACHER TRAINING CENTRE  
(formerly known as Human Resource Development Centre)  
**KURUKSHETRA UNIVERSITY KURUKSHETRA**  
(Established by the State Legislature Act XII of 1956)  
(‘A+’ Grade, NAAC Accredited)



**PROF. PREETY JAIN**  
**DIRECTOR**

Tel : Off: 01744-238472, 238814  
Intercom : 2518, 2519  
E-mail : [ugcasc\\_kuk@yahoo.co.in](mailto:ugcasc_kuk@yahoo.co.in)  
[asc@kuk.ac.in](mailto:asc@kuk.ac.in)

No.-MMTTC/I/RC/24/581-613  
Dated: 04-01-2024

**List of 33 participants is attached herewith.**

**Subject : 2-week Online Multidisciplinary Refresher Course in Environment Challenges  
(An Initiative for Quality Enhancement in Teaching-Learning & Research).**

Dear Applicants,

I am pleased to inform you that you have been selected for participation in the 2-week Online Multidisciplinary Refresher Course in Environment Challenges (An Initiative for Quality Enhancement in Teaching-Learning & Research) to be organized under the UGC scheme from 15-01-2024 to 29-01-2024 by UGC-Malaviya Mission Teacher Training Centre, K.U. Kurukshetra.

You are required to pay an admission fee (non-refundable) of Rs. 1000/- (Rupees One Thousand only) in the shape of Bank Draft payable at Kurukshetra in the name of the Registrar, Kurukshetra University, Kurukshetra. A scanned copy of the Bank Draft alongwith the Relieving/NOC through e-mail ([seminarhrdc@kuk.ac.in](mailto:seminarhrdc@kuk.ac.in)) should be sent to this office latest by 15-01-2024 failing which it will be presumed that you are not interested in attending the course. The hard copy of the Bank Draft alongwith Relieving/NOC should be sent to this office latest by 20-01-2024 addressed to Director, Malaviya Mission Teacher Training Centre (HRDC), K.U. Kurukshetra-136119.

As per directions of UGC, performance of the participants in the course will be assessed. Those teachers who get ‘F’ grade are required to repeat the programme after a gap of one year without any financial commitment of the UGC-MMTTC. The grades will be indicated on the certificate to be given to the participants. **As per University Grants Commission notification, the participants will be treated ON DUTY and not on duty leave.**

**The course will be conducted through online mode of delivery. The Link for joining the course will be sent by mail shortly.** You are directed to join the course at 09:30 AM on 15-01-2024 on this link. As per latest guidelines, the teachers would be required to present one seminar paper during the course. The time and date of presentation shall be notified during the course. In case of any default by the applicant, the Director has all the rights reserved to cancel the admission to the course. The teachers will not be given any type of leave during the course. Only those who attend full two week programme will be given a certificate.

**Wishing you all the best.**

Yours sincerely

  
DIRECTOR

LIST OF PARTICIPANTS WHO APPLIED FOR PARTICIPATION IN 2-WEEK ONLINE  
MULTIDISCIPLINARY REFRESHER COURSE IN ENVIRONMENT CHALLENGES

(An Initiative for Quality Enhancement in Teaching-Learning & Research)

TO BE HELD FROM 15-01-2024 TO 29-01-2024

1. Dr. (Ms) Pooja Arora, Assistant Professor, Institute of Environmental Studies, Kurukshetra University, Kurukshetra
2. Dr. (Ms) Dipti, Assistant Professor, Institute of Environmental Studies, Kurukshetra University, Kurukshetra
3. Dr. (Ms) Bhawna Dahiya, Assistant Professor, Institute of Environmental Studies, Kurukshetra University, Kurukshetra
4. Dr. Sandeep Kumar, Assistant Professor of Geography, Institute of Integrated and Honors Studies, Kurukshetra University, Kurukshetra
5. Dr. Ravinder Jangra, Assistant Professor, Department of Geography, Kurukshetra University, Kurukshetra
6. Dr. Abhishek Kumar, Assistant Professor of Computer Science, S.A. Jain College, Ambala City
7. Dr. Jasvinder Singh, Assistant Professor of Punjabi, D.A.V. College, Cheeka (Kaithal)
8. Dr. Ram Juwari, Assistant Professor of Geography, Shri Kapil Muni Govt. College for Women, Kalayat (Kaithal)
9. Dr. S.K. Chamar, Assistant Professor of Geography, Govt. College, Julana (Jind)
10. Dr. Sandeep Dhundhara, Assistant Professor of Electrical Engineering, Department of Basic Engineering, College of Agricultural Engineering & Technology (COAE&T) CCS Haryana Agricultural University, Hisar
11. Mrs. Manju Shamra, Assistant Professor of Geography, Dayanand College, Hisar
12. Mrs. Priyanka Shandilya, Assistant Professor of Geology, Pt. Neki Ram Sharma Govt. College Rohtak
13. Ms Aruna, Assistant Professor of Geography, Pt. N.R.S. Govt. College, Rohtak
14. Dr. Sanjay Deswal, Assistant Professor of Geography, Govt. College, Chhara (Jhajjar)
15. Dr. Neeraj Yadav, Assistant Professor of Geography, Govt. College, Chhilro (Mahendergarh)
16. Dr. (Ms) Seema, Assistant Professor of Geography, Govt. College, Chhilro (Mahendergarh)
17. Dr. Pushpinder Kaur Mann, Assistant Professor, University Institute of Legal Studies, Panjab University, Chandigarh
18. Dr. (Ms) Meenu Saihpal, University Institute of Legal Studies, Panjab University, Chandigarh
19. Mr. Rajeev Kumar, Assistant Professor of Geography, TJCM Govt. College, Sujampur (H.P.)
20. Mr. Naresh Kumar, Assistant Professor of Commerce, Govt. College, Hamirpur (H.P.)
21. Dr. Narender Kumar, Assistant Professor, Department of Management Studies, Kumaun University Nainital (Uk)
22. Mrs. Chesfeeda Akhter, Assistant Professor of Botany, Govt. Degree College, Sopore, Dist. Baramulla (J&K)
23. Ms Nisha Kumari, Librarian, Govt. Degree College, R.S. Pura (J&K)
24. Dr. Naseer Ahmad Dar, Assistant Professor of Environmental Science, M.G. Degree College, Charari Sharief (J&K)
25. Dr. Kuldeep, Assistant Professor, Department of Education, Suresh Gyan Vihar University, Jaipur (Raj.)
26. Mr. Sedu Ram Rawat, Assistant Professor of Geography, Govt. P.G. College Viratnagar, Dist. Jaipur (Raj.)
27. Dr. Ranjitsinh Balvantsinh Rathod, Assistant Professor of Physical Education, Y S Arts And K S Shah Commerce College Devgadhbhari Dist-Dahod (Gujarat)
28. Dr. Jayvardhan Vithalrao Balkhande, Assistant Professor of Zoology, Digambarrao Bindu Arts, Commerce & Science College, Bhokar Dist Nanded (M.S.)
29. Dr. Jadhav Pragati Shankar, Assistant Professor of Physics, R. B. Narayanrao Borawake College, Shrirampur (M.S.)



30. Mr. Yogesh Purushottam Wayal, Assistant Professor of Chemistry, Shri D. M. Burungale Science & Art's College, Shegaon (M.S.)
31. Dr. Ajay Balu Wadekar, Assistant Professor of Chemistry, Shri D. M. Burungale Science & Art's College, Shegaon (M.S.)
32. Dr. S. Seenivasan, Assistant Professor of Commerce, G.T.N. Arts College, Dindigul (T.N.)
33. Mr. Amit Kumar Yadav, Assistant Professor, Department of Civil Engineering, Central University of Jharkhand Ranchi (Jharkhand)

Yours sincerely

  
DIRECTOR



**MAHARSHI DAYANAND UNIVERSITY, ROHTAK**

(A State University established under Haryana Act No. 25 of 1975)

NAAC Accredited 'A+' Grade University



**2<sup>nd</sup> INTERNATIONAL CONFERENCE OF INDIAN SCIENCE CONGRESS ASSOCIATION-ROHTAK CHAPTER**  
**ON**  
**"SCIENCE & TECHNOLOGY FOR SUSTAINABLE FUTURE"**

Organized by  
 University Institute of Engg. & Technology, M.D. University, Rohtak  
**(ICSTSIF - 2024)**

**February 7-8, 2024**

*Certificate*

Certified that Prof./Dr./Mr./Ms. .... *Sahil* ..... of  
 ..... *Govt. College Julana, Jind, Haryana* ..... has  
 Attended/Presented Research Paper (Oral/Poster/Invited Talk/Chair  
 Session/Coordinator) entitled *Nano-Technology in Grain Storage*.....  
 ..... *Insect Pests* ..... in the "2<sup>nd</sup> International Conference  
 of Indian Science Congress Association-Rohtak Chapter "Science &  
 Technology for Sustainable Future" held at University Institute of  
 Engg. & Technology, M.D. University, Rohtak on February 7-8, 2024.

*S. P. Khatkar*  
 (Prof. S. P. Khatkar)

Convener: ICSTSIF-2024,  
 Emeritus Scientist  
 Department of Chemistry

*V. Singh*  
 (Prof. Vadhvir Singh)

Director,  
 UIET,  
 M.D. University, Rohtak





**UNIVERSITY GRANTS COMMISSION**  
**MALAVIYA MISSION TEACHER TRAINING CENTRE**

(Erstwhile Human Resource Development Centre)

UNIVERSITY OF NORTH BENGAL

ORGANIZES

**NEP ORIENTATION & SENSITIZATION PROGRAMME**

on

**Research and Development**

**FROM 10<sup>th</sup> JANUARY 2024 TO 17<sup>th</sup> JANUARY 2024 (ONLINE)**



**Course Schedule:**

**Timings: 2:30 pm-4:00 pm & 4:00 pm-5:30 pm**

**Session 1: 10-01-24**

**Session 5: 15-01-24**

**Session 2: 11-01-24**

**Session 6: 16-01-24**

**Session 3: 12-01-24**

**Session 7: 17-01-24**

**Session 4: 13-01-24**

Members of the faculty of Colleges / Universities, Professors, Associate Professors, and Assistant Professors (Govt. / Govt. Aided & Private) shall participate. No registration fees are to be paid. This course will be considered for CAS as per UGC regulations.

clicking on the link <https://mmc.ugc.ac.in> as "University of North Bengal" and Training Program ID- **MMC-109-2024-JAN-A-00868**. Please upload your Nomination Letter, ID Card and Photo to the UGC portal.

An Online Certificate will be issued to those who will attend all the sessions and on completion of the Assessment test (16/01/2024, 4:00 pm - 5:30 pm)

In case of Registration Queries, contact [hrc@nbu.ac.in](mailto:hrc@nbu.ac.in) / Call @ 8759423813

In case of Technical Queries, please contact [ugc.technical@inlibnet.ac.in](mailto:ugc.technical@inlibnet.ac.in)





सत्यमेव जयते  
Government Of India



ज्ञान-विज्ञान विमुक्तये  
University Grants Commission

## CERTIFICATE OF PARTICIPATION

### NEP 2020 ORIENTATION & SENSITIZATION PROGRAMME

This is to certify that **Abhishek Sharma** , **Assistant Professor** from **Govt College Julana (Jind)** has completed the NEP 2020 Orientation & Sensitization Programme on *Research and Development* under Malaviya Mission Teacher Training Programme (MM-TTP) of University Grants Commission (UGC) Organized by the University of North Bengal from January 10, 2024 to January 18, 2024.

Date: 18/01/2024

Place: UGC-MM-TTC, University of North Bengal.

(Prof. Anjan Chakrabarti)  
Professor - Director, (MM-TTC)

## SUB-THEMES OF CONFERENCE

The following sub-themes will be covered in the conference. However, the list is only suggestive and any other related topic may also be considered:

- Foundation of Critical Thinking
- Promotion of Curiosity and Inquiry
- Understanding the Scientific Method
- Appreciation of Empirical Evidence
- Development of Skepticism and Open-mindedness
- Encouragement of Experimentation and Innovation
- Fostering Ethical Responsibility
- Empowerment Through Knowledge
- Preparation for a Technological Society
- Promotion of Global Citizenship
- Critical Thinking Skills
- Research and Inquiry
- Promotion of Rationality
- Open-mindedness
- Understanding the Scientific Method
- Ethics in Science
- Application of Scientific Knowledge
- भाषा एवं साहित्य में वैज्ञानिक दृष्टिकोण
- हिंदी भाषा और इसकी वैज्ञानिकता
- भारतीय दर्शन के वैज्ञानिक आयाम

## REGISTRATION FEE

RESEARCH SCHOLAR /STUDENTS = 300 ₹.  
FACULTY MEMBER = 500 ₹.  
INTERNATIONAL PARTICIPANTS = 1500 ₹.

### Account Details

Name- SUS GOVT COLLEGE MATAK MAJRI  
A/C NO-50100314761759  
IFSC- HDFC0002185

Registration link:

<https://forms.gle/WeYe2Xq6mv6nZL1q9>



➤ Or scan here to register:

Research Papers selected through the peer-review process will be published in an edited book with ISBN and 1000 ₹ publication charges will apply.

## IMPORTANT DATES

LAST DATE FOR SUBMISSION OF ABSTRACT  
**20<sup>th</sup> MARCH 2024**  
ACCEPTANCE INTIMATION OF THE ABSTRACT  
**21<sup>ST</sup> MARCH 2024**  
SUBMISSION OF FULL-LENGTH PAPER  
**22<sup>nd</sup> MARCH 2024**

Submit the abstract/ full length paper to  
[susgchem2024@gmail.com](mailto:susgchem2024@gmail.com)

# S.U.S. GOVT. COLLEGE MATAK MAJRI, KARNAL

S.U.S. Govt. College Matak  
Majri Karnal-132041  
Haryana(India)  
0184-2382469



[susgcm@gmail.com](mailto:susgcm@gmail.com)



March 22, 2024 (Friday), 9AM onwards  
Website: [susgcatakrajri.ac.in](http://susgcatakrajri.ac.in)



One Day  
International  
Conference on



**IMPORTANCE OF EDUCATION TO  
DEVELOP SCIENTIFIC TEMPER  
(Multidisciplinary) on 22<sup>nd</sup> March 2024**



Organized by: Department of Chemistry,  
S.U.S. Govt. College Matak Majri, KARNAL

Sponsored by: Department of Higher Education, Haryana

## ABOUT THE DEPARTMENT

The department of Chemistry was established in 2014 and it offers a vibrant environment for undergraduate education. The department has a dedicated team of highly qualified faculty members from renowned institutes from India. The faculty provides strong base to the students of non-medical and medical and they also provides exposure to the latest technologies. The infrastructure and lab facilities are upgraded every year to make the opportunities available for students The growing department with young faculty offers a vibrant atmosphere to nurture the spirit of scientific enquiry. Career Counselling sessions, lectures, workshops in association with other Cells of the college are also organized to apprise the students of the various opportunities available to them after the completion of their degree

## ABOUT THE HOST COLLEGE

Shaheed Udham Singh Government College Matak Majri is situated in the lush green rural area of district Karnal (Haryana). This college is affiliated to Kurukshetra University, Kurukshetra and approved by University Grants Commission. The college was established in 1995. Later on, it was taken over by Haryana Government in 2005 and since that time it is being counted among one of the best rural colleges of Haryana. With nearly 1400 students on its rolls, the college excels in various fields of academics, sports, cultural activities and co-curricular activities. The college offers graduation and post-graduation courses in Arts and Humanities (B.A., M.A. English and M.A. History), Science (B.Sc. - Medical, Non-Medical, Computer Science and B.C.A.) and Commerce (B.Com and M.Com)

## ABOUT THE CONFERENCE

The conference offers a platform for worldwide researchers, scholars, and scientists from academia, industry, and government to discuss the role of education in the development of scientific temper. Even after the 75th year of independence, we find a lot of superstitions in Indian society and around the world. Therefore, it is the need of the hour that we think about education that can develop scientific temper in the people of India and the whole world.

## PAPER SUBMISSION GUIDELINES

- The abstract and full-length research paper should be original and written in approximately 250 and 3500 words respectively.
- Abstract should include title of paper, name of author(s), affiliation, complete address, Mobile/whatsapp no. (s) and email id(s).
- Full paper should be in docx format, Times New Roman, 12 Font size, 1.5 line spacing and must be in APA style.
- For Hindi, paper should be in docx format, Kruti dev 10, 12 Font size, 1.5 line spacing and must be in APA style.
- Full paper along with abstract should be sent latest by 21<sup>st</sup> March 2024 by email at [suscchem2024@gmail.com](mailto:suscchem2024@gmail.com)

## FOR CORRESPONDENCE AND QUERIES

**Dr. Gulab Singh, Convener, 9416978521**  
**Dr. Suresh Kumar, Convener, 7027146632**  
**Dr. S.B Bhardhwaj, Org. Secretary, 9416413096**  
**Mr. Sumit Goel, Org. Secretary, 8168211345**  
**Mr. Raj Kumar, Org. Secretary, 8059587414**  
**E-mail: [suscchem2024@gmail.com](mailto:suscchem2024@gmail.com)**

## ACCOMODATION FACILITY

Accommodation (If Required) will be provided on paid basis only.

## ADVISORY/SCIENTIFIC COMMITTEE

- >Dr. Satish Bhardwaj
- >Dr. Rajiv Gupta
- >Dr. Surender Singh
- >Dr. Raj Kumar
- >Dr. Anil Kumari
- >Dr. Ranbir Singh
- >Dr. Meera

## INTERNATIONAL ADVISORY COMMITTEE

1. Prof. Rachna Sadana  
University of Houston, USA
2. Dr. Sreenivasa Rao Oruganti  
Senior Scientist Geo Vax Inc Atlanta, USA
3. Dr. Morihiko Hamada, Associate Professor  
Kobe City College of Technology, Japan
4. Dr. Inderjeet Barve  
National Chiao Tung University Taiwan
5. Dr. Badri Prasad  
University of Cambridge, UK
6. Dr. Vikas  
IMS, University of International Business,  
Almaty, Kazakhstan



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# Exploring NEP 2020: Anticipations, Challenges and Actualities

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# 3

## Community Engagement: Stakeholder Participation in Education

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### Abstract

Community engagement in education is fundamental for fostering inclusive and empowering learning environments. This chapter delves into the significance, challenges, and transformative potential of stakeholder participation in education. It explores the dynamic role of communities in shaping educational experiences, identifies key stakeholders, and showcases successful models of community engagement through case studies. Despite facing challenges such as resource disparities and communication barriers, strategies for overcoming these obstacles are proposed, emphasizing the importance of trust-building and equity-centered approaches. Looking toward the future, the chapter highlights the potential of technology and innovation to enhance community engagement in education, offering opportunities for broader collaboration and participation among stakeholders. By embracing inclusive practices and leveraging technological advancements, educational institutions can cultivate thriving learning communities and foster equitable educational outcomes for all learners.

**Keywords:** NEP 2020, Stakeholders, Community Engagement, Technical Innovations.

### Introduction

Community engagement is a vital component of education, connecting learners, educators, and society. Throughout this chapter, we've explored its profound impact and diverse dimensions. It embodies inclusivity, shared responsibility, and



collective empowerment, recognizing that learning extends beyond classrooms into every aspect of life. By forging partnerships between schools and communities, we integrate learning into daily life. Community engagement enriches education by bridging theory and practice through real-world experiences like mentoring and internships, preparing students for the future and inspiring innovation. It fosters social cohesion, transcending barriers and promoting empathy and diversity. Despite challenges like logistical constraints and disparities, inclusive practices ensure every voice is valued. As we delve into case studies and best practices, let's commit to leveraging community wisdom for a brighter educational future. Collaboration, from grassroots initiatives to national policies, is key to fostering thriving learners and flourishing communities. Let's embark together on this transformative journey toward an inclusive tomorrow.

### **Understanding the Role of Community in Education**

The community's role in education is vital, shaping individuals' educational journeys and contributing to society's well-being. Acting as a crucial support system, communities offer resources, guidance, and opportunities for learners to thrive. This chapter explores various dimensions of community involvement in education, delving into its significance, challenges, and transformative potential. Communities serve as the foundation for learning and development, influencing attitudes towards education from early childhood. As children interact with social norms and familial traditions, they build the groundwork for their educational paths. As learners progress, the community's role evolves, engaging a broader range of stakeholders. Parents and caregivers become active participants, supporting academic endeavors and advocating for educational needs. Meanwhile, local businesses, civic organizations, and cultural institutions offer extracurricular opportunities, enriching educational experiences. Communities also serve as experiential learning labs, providing real-world contexts for students to apply knowledge and develop critical thinking skills. Moreover, they shape educational policies and priorities, advocating for equitable access to resources and holding institutions accountable. Despite the benefits, community involvement faces challenges like resource disparities and cultural barriers, requiring commitment to transparency and collaboration. Understanding the dynamic interplay between communities and education enables harnessing collective wisdom for a more inclusive and enriching educational experience.

## Identifying Key Stakeholders and Their Contributions

Identifying key stakeholders in education is crucial for effective community engagement. These stakeholders, including parents, teachers, administrators, and local businesses, have a vested interest in educational processes and outcomes. Parents and caregivers support their children's education, advocating for their needs and actively participating in school activities. Teachers bring expertise and passion to classrooms, while administrators provide leadership and vision. Outside the school gates, local businesses, civic organizations, cultural institutions, and faith-based groups contribute through financial support and real-world experiences. Engaging with policymakers and advocating for evidence-based policies prioritizes student needs and social justice. Fostering authentic partnerships requires open communication, active listening, and collaborative problem-solving. By fostering trust, transparency, and mutual respect, educational institutions can harness stakeholders' collective wisdom and resources to create a responsive, equitable, and student-centered educational system.

### Case Studies: Successful Models of Community Engagement

Studying successful community engagement models offers valuable insights into collaboration strategies between educational institutions and local communities. Case studies provide real-world examples of implemented initiatives, showcasing their impact on educational outcomes and student success. These studies provide inspiration, identify best practices, and learn from others' experiences. They illustrate diverse collaboration strategies with parents, community organizations, businesses, and cultural institutions. Successful partnerships offer students real-world learning experiences, career exploration opportunities, and support services for learners' well-being. Case studies also highlight culturally responsive teaching practices and community-based learning experiences, promoting diversity and inclusion.

### Overcoming Challenges and Barriers to Stakeholder Participation

Stakeholder participation in community engagement in education faces various challenges that must be addressed to foster collaboration effectively. This section outlines common obstacles and suggests strategies for overcoming them.

- A. Lack of Awareness:** Many stakeholders may not understand the significance of their involvement in educational initiatives. Raising awareness and clarifying roles are essential to overcoming this barrier.
- B. Limited Resources:** Underserved communities may lack resources and capac-

ity, hindering their participation. Prioritizing equitable access and providing capacity-building opportunities can help address this challenge.

- C. Communication Barriers:** Language and cultural differences can impede effective communication. Inclusive communication strategies such as translation services and plain language materials can mitigate this barrier.
- D. Power Dynamics:** Systemic inequities may limit marginalized stakeholders' influence in decision-making processes. Equity-centered approaches and amplifying marginalized voices are crucial for addressing this challenge.
- E. Trust Building:** Historical mistrust between institutions and stakeholders can hinder collaboration. Transparency, accountability, and consistent communication are key to building and maintaining trust.
- F. Resistance to Change:** Stakeholders may resist significant shifts in practice. Involving them in decision-making processes and demonstrating the benefits of collaboration can help overcome this resistance.

Addressing these challenges requires a multifaceted approach that fosters inclusive communication, builds trust, and acknowledges systemic inequities. By doing so, educational institutions can create more impactful community engagement initiatives that support the success of all learners.

### **Future Directions: Harnessing Technology and Innovation for Enhanced Community Engagement**

Looking ahead to the future of community engagement in education, leveraging technology and innovation offers numerous opportunities to enhance collaboration, communication, and participation among stakeholders. This section explores the potential of technology to transform community engagement, highlighting emerging trends, promising practices, and key considerations for its effective use.

- A. Emerging Trends:** Technology advancements such as social media, virtual reality, and artificial intelligence provide new avenues for connecting with stakeholders and fostering collaboration across diverse communities.
- B. Promising Practices:** Virtual town hall meetings, online surveys, and collaborative digital platforms enable stakeholders to participate in educational decision-making processes regardless of location or time constraints.
- C. Key Considerations:** Addressing digital divides, ensuring privacy and data security, promoting digital literacy, and fostering inclusivity are crucial for effective technology-enabled engagement.



- D. Innovative Approaches:** Interactive webinars, virtual reality experiences, and online collaboration platforms facilitate engaging, participatory experiences for stakeholders.
- E. Role of Artificial Intelligence:** AI and data analytics offer insights into stakeholder preferences and needs, aiding in tailoring engagement strategies to meet evolving interests.

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# Bismuth Vanadate and 3D Graphene Composite Photoanodes for Enhanced Photoelectrochemical Oxidation of Water

Abhishek Sharma, Sudipa Manna, Sriram Kumar, and Ashis Kumar Satpati\*

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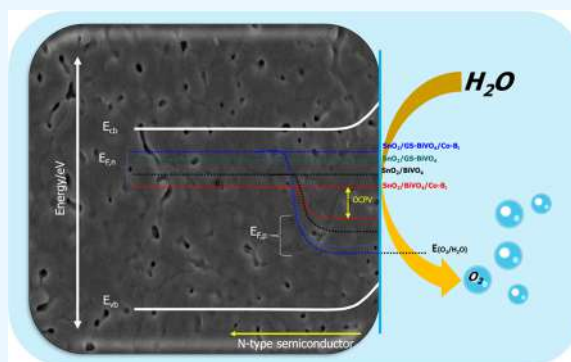


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**ABSTRACT:** Bismuth vanadate ( $\text{BiVO}_4$ ) has been one of the most promising photoanodes for the photoelectrochemical (PEC) water oxidation process. Efforts are still on to overcome the drawbacks of this photoanode to enhance the catalytic efficiency and improve the stability. In the present work, three-dimensional graphene (3D-G) was incorporated inside the  $\text{BiVO}_4$  matrix, primarily to improve the conductivity of the material. The photoanodes are fabricated with the incorporation of a  $\text{SnO}_2$  heterojunction and application of cobalt borate ( $\text{Co-B}_1$ ) as a cocatalyst. The incorporation of 3D-G has enhanced the photocurrent from 0.72 to 1.21  $\text{mA cm}^{-2}$  in  $\text{ITO}/\text{SnO}_2/\text{BiVO}_4$  and  $\text{ITO}/\text{SnO}_2/3\text{D-G-BiVO}_4$  materials; the photocurrent has been improved from 0.89 to 1.52  $\text{mA cm}^{-2}$  in  $\text{ITO}/\text{SnO}_2/\text{BiVO}_4/\text{Co-B}_1$  and  $\text{ITO}/\text{SnO}_2/3\text{D-G-BiVO}_4$ . Semiconductor properties are evaluated from the Mott-Schottky measurements, and the charge transfer and transport kinetics of the PEC process are measured from several photoelectrochemical investigations. Both the charge transport and the charge transfer efficiencies are enhanced upon inclusion of 3D-G into the catalyst system. The lifetime of the charge carrier is observed to be increased. The decrease in the decay kinetics of the holes, enhancement in the open-circuit photovoltage (OCPV), and the resulting modulation of the surface states are responsible for the enhancement in the surface charge transfer process due to the inclusion of 3D-G into the catalytic system. Therefore, the additional role of 3D-G in the modulation of the surface states and release of the Fermi level pinning has made the band alignment between the semiconductor and the analyte better, which resulted in enhanced catalytic performance in the photoelectrochemical oxidation of water.



## 1. INTRODUCTION

Generation of hydrogen using solar energy is one of the promising routes to harvest solar energy for sustainable utilization of renewable energy. The photoelectrochemical (PEC) splitting of water using solar light is the most promising route to harvest solar energy for sustainable energy generation with zero carbon footprints.<sup>1</sup> The overall water splitting reaction through the PEC route has the anodic process; the oxygen evolution reaction (OER) and the cathodic process; and the hydrogen evolution reaction (HER). However, the sluggish kinetics through complicated pathways makes the oxygen evolution reaction the rate-limiting step of the overall water splitting process. The development of an efficient photoanode for sustainable oxidation of water is therefore the most challenging in the overall PEC water splitting. The important photoanode materials that have been investigated over the years are  $\text{TiO}_2$ ,  $\text{WO}_3$ ,  $\alpha\text{-Fe}_2\text{O}_3$ , and  $\text{BiVO}_4$ ,<sup>2–6</sup> and most of these materials are not so expensive for practical utilizations. Among them,  $\text{BiVO}_4$  has been extremely promising due to some of the important parameters such as band gap  $\sim 2.4$  eV, favorable band position, photoelectrochemical stability in aqueous solution, earth abundance, and nontoxicity with a high theoretical efficiency of 7.5  $\text{mA cm}^{-2}$

under AM 1.5 G illuminations.<sup>7</sup> However, the experimentally observed solar to hydrogen (STH) conversion efficiency of the bare  $\text{BiVO}_4$  is only 5.2%; such lowering of experimental efficiency arises mainly due to the low surface kinetics, poor hole diffusion, and fast charge recombination.<sup>8–13</sup>

Several strategies have been adopted to enhance the experimental STH efficiency, which include heterojunction formation,<sup>14–18</sup> heteroatom doping,<sup>6,19,20</sup> creation of oxygen vacancies,<sup>21,22</sup> band engineering,<sup>20,23–26</sup> crystal facet engineering,<sup>27–29</sup> and nanostructure control;<sup>30</sup> all these processes are essentially aimed at enhancing the transport of the photo-generated holes from the bulk of the material to the interface. Heterojunction formation with suitable band positions has a specific role in transporting the majority carriers toward the sink through the generation of low-energy pathways, which

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reduces the electron–hole recombination. The sluggish OER kinetics at the interface and the associated trapped surface states cause the significant decrease in overall efficiency.<sup>31,32</sup> Surface modification using oxygen evolution catalysts (OECs) has been designed for the acceleration of the surface hole transfer kinetics of BiVO<sub>4</sub>-based photoanodes. The OEC catalysts such as Co–P,<sup>19,33–35</sup> Co–B,<sup>36–38</sup> NiOOH/Ni-borate,<sup>39</sup> FeOOH,<sup>24</sup> Ni(Fe)OOH,<sup>25</sup> and FeOOH/NiOOH<sup>7</sup> have been investigated to improve the onset potential and suppress the charge recombination for the PEC water oxidation. Among the different OECs, the Co-based cocatalyst, especially cobalt borate (Co–B<sub>i</sub>), has been extensively investigated in view of its superior catalytic activity in PEC water oxidation.<sup>40</sup> The enhancement of both the bulk and surface charge movements, which are called charge transport and charge transfer, respectively, through the modifications of the catalytic composite materials is therefore the important aspect to be worked on.

The carbon nanostructures have important roles in the electrochemical catalysis processes. The one-dimensional nanomaterial with sp<sup>2</sup>-bonded carbon in the form of carbon nanotubes (CNTs) is highly popular due to the enhanced conductivity and edge adsorption properties. The two-dimensional (2D) form of carbon as a graphene sheet has been in the spotlight since its discovery in 2004.<sup>41</sup> In the graphene sheet with the presence of sp<sup>2</sup> carbon in the honeycomb-like arrangements in a single plane, the material has one of the highest specific surface areas. The long-range  $\pi$ – $\pi$  stacking has resulted in several interesting properties; most importantly, the excellent electron mobility is of the primary interest for its use as a catalyst and as the catalyst support. The excellent thermal conductivity of graphene is also helpful in designing the catalyst support, as the material network would distribute the localized heat generated during the catalysis process. In spite having such good properties, when the 2D graphene is put on practical applications in energy harvesting and storage, it finds difficulty in sustainability due to the restacking of the graphene sheets.<sup>42–45</sup>

The alternate way to solve the issue is to construct three-dimensional (3D) interconnected structures in place of the 2D structure. The 3D structure essentially retains the goodness of the graphene network in addition to providing stability in the system. The 3D graphene (3D-G) nanostructures are generated through several synthesis protocols, and the performance of the materials varies with the variation in the synthesis protocols. The definition of the 3D graphene and differentiating it from the graphite originate from the involvement of a number of graphene layers and 3D structuring of the graphene sheets from the two-dimensional form. Presently, 3D graphene has been synthesized with graphene oxide (GO) as the starting material. BiVO<sub>4</sub> is entangled with the 3D-G matrix to generate the BiVO<sub>4</sub>/3D-G composite-modified photoanode. The modification of the PEC catalytic performances is discussed in the direction of enhancement of the conductivity of the material, essentially to drive the charge carrier in both the directions.

In some of our previous publications, we have tried to improve the catalytic performance of BiVO<sub>4</sub> through the formation of a SnO<sub>2</sub> heterojunction, doping with Mo, treatments by photocharging, and enhancement of the catalytic performance by generation of the electrocatalyst Co–B<sub>i</sub> outer layer.<sup>6,35</sup> The photocorrosion aspects of BiVO<sub>4</sub> have been reduced by generation of the TiO<sub>2</sub> surface protective layer

using the atomic layer deposition technique.<sup>46</sup> In addition to the enhancement of the stability of BiVO<sub>4</sub>, the TiO<sub>2</sub> surface layer is observed to enhance the catalytic performance. The present work has been focused on the enhancement of the conductivity of BiVO<sub>4</sub> through the incorporation of 3D-G into the BiVO<sub>4</sub> matrix. In addition to providing conductivity, the 3D-G matrix has the ability to hold the BiVO<sub>4</sub> for enhanced stability and also to channelize the charges for better catalytic performances and enhance both the charge transfer and transport processes. The 3D-G network is expected to provide the required electronic stability of the composite without any detrimental effect on the performance.

## 2. MATERIALS AND METHODS

**2.1. Materials.** Bismuth(III) nitrate (Bi (NO<sub>3</sub>)<sub>3</sub>·5H<sub>2</sub>O, 98%), ammonium vanadate (NH<sub>4</sub>VO<sub>4</sub>, >99%), stannic chloride (SnCl<sub>4</sub>, 98%), sodium sulfite (Na<sub>2</sub>SO<sub>3</sub>, 98%), and cobalt(II) nitrate hexahydrate (Co(NO<sub>3</sub>)<sub>2</sub>·6H<sub>2</sub>O, ≥98%) were purchased from Sigma-Aldrich. Sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>), sodium hydroxide (NaOH, 98%), and boric acid (H<sub>3</sub>BO<sub>3</sub>, 98%) were obtained from Sarabhai M Chemicals. Ethylene glycol (EG) and potassium ferricyanide were purchased from SD fine Chemicals Limited. All the chemicals were used without any further purification. Indium-doped tin oxide (ITO) was used as a transparent substrate for the thin film fabrication.

**2.2. Fabrication of the Photoanode.** The SnO<sub>2</sub>/BiVO<sub>4</sub> heterojunction was prepared by a previously reported method.<sup>6</sup> Briefly, 0.2 M SnCl<sub>4</sub> in EG was stirred overnight and a 100  $\mu$ L aliquot was spin-coated onto ITO at 2000 rpm for 30 s and dried at 200 °C for 5 min. The 8 cycles of spin coating were performed followed by 2 h of annealing at 450 °C (heating rate was kept 5 °C per min). These modified electrodes are named as ITO/SnO<sub>2</sub>. These ITO/SnO<sub>2</sub> electrodes were further spin-coated in a similar fashion with bismuth vanadate precursor solution, which was prepared by dissolving 0.2 M bismuth nitrate and 0.2 M ammonium vanadate in a 4:1 ethylene glycol/water mixture. 3D-G was prepared from GO, 100 mg of GO powder was dispersed into 200 mL of deionized (DI) water, and 4 g of urea was added to the solution at 0 °C under stirring conditions. 200 mL of 0.025 M HCl solution was added and kept under vigorous stirring overnight. The material was collected by centrifuging and redispersed into 100 mL of DI water. 0.5 g of ascorbic acid was added to this mixture and left undisturbed at 100 °C for 6 h. A cylindrical foam structure was formed, and it was lyophilized to obtain the 3D-G. For inclusion of 3D-G, the ITO/SnO<sub>2</sub> electrode was coated with the bismuth vanadate precursor containing thoroughly mixed 1 mg/mL 3D-G. Finally, these electrodes were annealed at 450 °C for 2 h under a nitrogen atmosphere to avoid decomposition of 3D-G, and the samples without 3D-G are annealed under atmospheric conditions. The electrodes with 3D-G are named ITO/SnO<sub>2</sub>/3D-G-BiVO<sub>4</sub>, and those without 3D-G are named as ITO/SnO<sub>2</sub>/BiVO<sub>4</sub>.

To further improve the catalytic activity of the electrodes, photoassisted electrodeposition of cobalt borate (Co–B<sub>i</sub>) was performed. The deposition bath was prepared by dissolving 2 mM Co(II) nitrate in 0.1 M borate buffer solution of pH 8. Photoassisted electrodeposition was performed at 0.86 V vs reversible hydrogen electrode (RHE) under 1 sun light irradiated using a solar simulator fitted with an AM 1.5 G filter. The ITO/SnO<sub>2</sub>/BiVO<sub>4</sub> electrode modified with Co–B<sub>i</sub> is named as ITO/SnO<sub>2</sub>/BiVO<sub>4</sub>/Co–B<sub>i</sub>, and similarly, the Co–





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( Convener )





क्षमता निर्माण आयोग  
मिशन कर्मयोगी

75  
आज़ादी का  
अमृत महोत्सव



# हरियाणा कर्मयोगी कार्यक्रम

प्रमाण पत्र

प्र. क्र. JIN-279234

यह प्रमाण पत्र विधिवत स्वीकार करने के लिए जारी किया जाता है कि श्री/श्रीमती/सुश्री **Sonia** ने मिशन कर्मयोगी के तहत हरियाणा कर्मयोगी कार्यक्रम को सफलतापूर्वक पूरा कर लिया है। हरियाणा कर्मयोगी के रूप में आपकी यात्रा के लिए हम शुभकामनाएँ देते हैं।

*Shrinivas V*

श्रीनिवास वेंकटराम,  
संस्थापक और नेतृत्वकर्ता, इल्युमिन



*चंद्रलेखा*

चंद्रलेखा मुखर्जी,  
महानिर्देशक, हिपा





सत्यमेव जयते

Government of India

**MALAVIYA MISSION**  
**TEACHER**  
**TRAINING PROGRAMME**

**CERTIFICATE OF PARTICIPATION**



ज्ञान-विज्ञान विमुक्तये

University Grants Commission

**NEP 2020 ORIENTATION & SENSITIZATION PROGRAMME**

This is to certify that Mr. Sahil, Assistant Professor, Department of Chemistry from Govt. College, Julana(Jind) Affiliated to CRSU, Jind has completed Online NEP 2020 Orientation & Sensitization Programme under Malaviya Mission Teacher Training Programme (MM-TTP) of University Grants Commission (UGC) Organized by Malaviya Mission Teacher Training Centre (MM-TTC), Bhagat Phool Singh Mahila Vishwavidyalaya, Sonipat, Haryana, from 01 March 2024 to 07 March 2024.

Ref No. BPSMV/MMTTC/2024/530

  
Director/Coordinator (MM-TTC)