



# HANS RAJ COLLEGE UNIVERSITY OF DELHI

## FACULTY PROFILE

Title	Prof. (Dr.)	First Name	Jyoti	Last Name	Bhola
Designation		Professor			
Address		Department of Mathematics, Hans Raj College, University of Delhi, Delhi-110007			
Phone No    Office		01127666338			
Residence		RP-77, Maurya Enclave, Pitampura, Delhi-110034			
Email		<a href="mailto:jbhola@hrc.du.ac.in">jbhola@hrc.du.ac.in</a> <a href="mailto:jbhola.24@gmail.com">jbhola.24@gmail.com</a>			
Educational Qualifications					
Degree	Institution			Year	
Ph.D.	University of Delhi			2010	
M.Phil.	University of Delhi			2007	
PG	St. Stephen's College, University of Delhi			2005	
UG	Janaki Devi Memorial College, University of Delhi			2003 (Gold Medalist)	
Areas of Interest / Specialization					
<ul style="list-style-type: none"><li>• Operator Theory (Functional Analysis)</li><li>• Mathematical Modeling using Differential equations</li></ul>					

<b>Teaching experience: 20 years</b>	
<ul style="list-style-type: none"> <li>• Jesus and Mary College, University of Delhi (25.7.2005 - 16.8.2005)</li> <li>• Miranda House, University of Delhi (17.7.2006 - 17.8.2006)</li> <li>• Hansraj College, University of Delhi (18.8.2006 – till date)</li> </ul>	
<b>Subjects Taught</b>	
<u>UG level</u> Real Analysis Calculus Ordinary Differential equations and Mathematical modeling Abstract Algebra (Rings and Vector Spaces) Partial Differential Equations Research Methodology	<u>PG level</u> Functional Analysis
<b>Software knowledge</b>	
Wolfram Mathematica, MATLAB, Maxima	
<b>Publications Profile</b>	
<b><i>Research papers published in Refereed/ Peer Reviewed Journals</i></b>	
1. Essentially slant Hankel operators, Bulletin of the Malaysian Mathematical Sciences Society, Malaysia, Vol. 31, No. 2(2008), 165–173. <b>(SCIE/ SCOPUS/zbMATH indexed)</b> 2. Generalized essentially slant Hankel operators, International Journal of Pure and Applied Mathematics, Bulgaria, Vol. 47, No. 2(2008), 165–173. <b>(SCOPUS indexed)</b> 3. $k$ th-order slant Hankel operators, Mathematical Sciences Research Journal, USA, Vol. 12, No. 3(2008), 53–63. <b>(SCOPUS indexed)</b> 4. The compression of a $k$ th-order slant Hankel operator, Ganita, India, Vol. 59, No. 1(2008), 1–11. <b>(UGC CARE- I listed)</b> 5. Essentially slant Toeplitz operators, Banach J. Math. Anal., Iran, Vol. 3, No. 2(2009), 1–8. <b>(SCIE/ SCOPUS/zbMATH indexed)</b> 6. Spectrum of a $k$ th-order slant Hankel operator, Bulletin of Mathematical Analysis and Applications, Vol.3, Issue 2 (2011), 175-183. <b>(ESCI/Zentralblatt/MathSciNet indexed)</b>	

7. Weyl's theorem for a class of operators, Int. J. Contemp. Math. Sciences, Vol.6 (2011), No. 25, 1213-1220. **(Peer-reviewed/ Scilit indexed)**
8. Essentially  $\lambda$ -Hankel operators, Journal of Mathematics, Vol.2013, Article ID 865396, 5 pages. **( SCIE/ SCOPUS/zbMATH indexed)**
9. Enhanced Properties of SAW Device Based on Beryllium Oxide Thin Films, *Crystals* **2021**, *11*, 332. **(SCIE/SCOPUS indexed)**
10. Corona mahamari ke dauran digital vikas, Samsamyik Srijan, Year -11, No. 21, January-March 2021 issue (ISSN: 2320-5733). **(UGC CARE- I listed)**
11. A study on use of mathematical programs for design of electronic circuits in cybernetic-physical learning environment, International Journal of Information and Education Technology, 11(11), 504-509 (2021) **(SCOPUS indexed)**
12. Trajectory of Corona Epidemic in India: An initial phase predictive mathematical model and the present status, 4(2): 2020. ABBA.MS.ID.000588. DOI: 10.33552/ABBA.2020.04.000588. *(Published: July 2021)* **(Peer-reviewed/Scilit indexed)**
13. A Mathematical Reflection of COVID-19 and Vaccination Acceptance in India, Asian Pacific Journal of Health Sciences, 8(3), 150–157 (2021). **(UGC CARE- I listed)**
14. A comparative study on the use of physical and e-labs: a case study at University of Delhi, Samriddhi, Institute of Technology, School of Management Sciences, Lucknow, Vol 14 (1), 2022. **(UGC CARE- I listed)**
15. A Structural Model of Teacher Learning, Satisfaction, Attitude and Confidence in Faculty Development Programmes. Vision, SAGE, July 2022. doi:10.1177/09722629221107229 **(SCOPUS indexed)**
16. Generalized (C,r)-Hankel operator and (R,r)-Hankel operator on general Hilbert spaces. Commun. Korean Math. Soc. 2023; 38:821-835. <https://doi.org/10.4134/CKMS.c220297> **(ESCI /SCOPUS indexed)**
17. Insights into the Air Quality Indices and its Linkage with Diwali Festival Celebrations in Delhi, India in November 2023: A Case Study, International Journal of Plant and Environment (2024), 10(1), 1-4. **(UGC CARE- I listed)**
18. Properties of (C, r)-Hankel Operators and (R, r)-Hankel Operators on Hilbert Spaces, Kragujevac J. Math. (2025), Accepted. **(ESCI /SCOPUS indexed)**
19. Properties of 2-Toeplitz operator and its generalization, Advances in Operator Theory 10, 77 (2025) <https://doi.org/10.1007/s43036-025-00464-8> **(ESCI /SCOPUS indexed)**

## **Books and Chapters**

- Authored an e-lesson entitled “Automorphism groups, characteristic subgroups and commutator subgroup” for the paper C12 (Group Theory II- Algebra IV) published by ILL, University of Delhi (ISSN: 2349-154X, ISBN: 978-93-86264-07-7, Published in January 2017).
- Authored a chapter entitled “The Konigsberg Bridge Problem: A Matrix Approach” in Topics in Mathematical Sciences, published by CPDHE, University of Delhi in 2017 (ISBN: 978-81-93451-96-0).
- A Comprehensive Textbook of Mathematics for Class XII- Volume 1, March 2018, (ISBN: 9789387702462), Taxmann Publications (P.) Ltd., India.
- A Comprehensive Textbook of Mathematics for Class XII- Volume 2, April 2018, (ISBN: 9789387702745), Taxmann Publications (P.) Ltd., India.
- CBSE Exam Cracker (Mathematics) for Class XII, December 2018, (ISBN: 9789388266901), Taxmann Publications (P.) Ltd., India.

## **Other Articles**

- Co-authored an article entitled “Corona Epidemic in Indian Context: Predictive Mathematical Modelling”, archived under medRxiv, April 2020.  
  
[ medRxiv preprint doi: <https://doi.org/10.1101/2020.04.03.20047175> ]
- Co-authored an article entitled “Assessing the impact of lockdown on undergraduate teaching: a survey based approach”, published in Digital Learning Magazine, Elets, May 2020  
  
[[Assessing the impact of lockdown on undergraduate teaching: A survey based approach](#) ]
- Co-authored an article on “Viewing Corona Pandemic with Mathematics glasses: an overview”, published in Hans Shodh Sudha, Hansraj College, University of Delhi, Vol 1, July-September 2020.  
<https://hansshodhsudha.com/first-second-issues/New%20Hansraj%20College%20Book-1-81-87.pdf>

## **Conferences/ Workshops/FDPs( Organization/ Paper Presentation / Participation)**

1. Participated in the National Symposium on Recent Advances in Optimization Theory and Applications held during Oct 27-28, 2006 at Academic Research Center, University of Delhi.
2. Participated in the three-day UGC National Seminar on “21st Century Renaissance: Transformation in Technology and Life” held at Delhi College of Arts and Commerce during April 2-4, 2007.
3. Participated in the National Workshop on Analysis held at the Department of Mathematics, University of Delhi, during Sep 27-28, 2007.
4. Participated in International Conference on Operator Theory and Related Areas held at the Department of Mathematics, University of Delhi, during January 9-12, 2008.

- Was a member of the Academic Programme and Publication Committee in the conference.
- Presented a paper entitled “Essentially Slant Toeplitz operators” in the same.

5. Participated in Advanced Training in Mathematics for Lecturers (ATML) in Real Analysis held at the Department of Mathematics, University of Delhi, during March 22- April 3, 2010.

6. Participated in the National Workshop on ‘Differential Equations, Computing and Modelling’ conducted at the Department of Mathematics, University of Delhi, during Dec 20-24, 2010.

7. Participated in the International Conference on Innovating Education in Asia held at Hans Raj College, University of Delhi, during Oct 31- Nov 02, 2015.

- Presented a paper entitled “To teach is to learn twice- An article on innovative teaching in Mathematics”.

8. Participated in the seven days Workshop on ‘Integrating ICT (Information and Communication Technology) in Teaching and Learning’ held at Hans Raj College, University of Delhi, during Dec 11-18, 2015.

9. Participated in the DBT-sponsored seminar on ‘Physics of stars’ held at Hans Raj College, University of Delhi, on April 1, 2016.

10. Coordinated a one day workshop on LaTeX organized by the Department of Mathematics, Hans Raj College, University of Delhi, on April 9, 2016.

11. Participated in Capacity Building Workshop on e-content creation in Mathematics held at ILL, University of Delhi, on October 28, 2016.

12. Organized a seminar on “Management skills in office administration-Practices and Advances” for the non teaching staff of colleges of Delhi University under IQAC, Hansraj College during Nov 22-23, 2016.

13. Participated as a judge for slogan competition on World Water Day held on March 22, 2017 at Hansraj College, University of Delhi.

14. Participated in the seminar on "Radiation hazards and monitoring -techniques and materials" organized at the Department of Physics and Electronics, Hansraj College on April 10, 2017.

15. Participated in Faculty Development Programme on “Digital Literacy: An introduction to ICT skills” at Department of Physics and Electronics, Hansraj College during Sep 15-17, 2017.

16. Coordinated the fourth Self- Defense Winter Camp conducted by Self Defense Wing of Special Police Unit For Women and Children from December 12, 2017 to January 11, 2018 at Hansraj College, University of Delhi.

17. Convened a two - days’ workshop on “Mathematica: A Tool for Computational Analysis” organized by the Department of Mathematics, Hansraj College, University of Delhi, during March 10-11, 2018.

18. Participated in a one day workshop on “How to get research papers published in right journals” organized by Hansraj College in collaboration with Grace India Educational Charitable Trust, Delhi on October 27, 2018.

19. Participated in a one-week Faculty Development Programme on “Software packages for Mathematical Sciences” from Nov 14-19, 2018 at MHRFDC, Hansraj College, University of Delhi.

20. Participated in a one-week Faculty Development Programme on “Understanding the connection of Mathematics with the world around us: an application based learning” during June 20-26, 2019 at MHRFDC, Hansraj College, University of Delhi.
21. Contributed as Co-Convener of one week Faculty Development Programme on “MOOCs, E-content development and Research design” organized by Sri Aurobindo College (Evening) in collaboration with MHRFDC, Hansraj College, University of Delhi during November 16- 22, 2019.
22. Contributed as Programme Co-Coordinator in the National Leadership Summit organized by MHRFDC and IQAC, Hansraj College during December 6-7, 2019.
23. Contributed as Programme Coordinator in one day National Webinar on “Teachers and Technology: The Road Ahead” organised by MHRFDC, Hansraj College on April 25, 2020.
24. Contributed as Programme Coordinator in one week online Faculty Development Programme on “Mathematica- A system for Modern Technical Computing ” organised by MHRFDC, Hansraj College, University of Delhi during August 21-26, 2020.
25. Convened a two-week Faculty Development Programme on “Transformation in Higher Education: Issues and Road Ahead” organised by Government Degree College for Women, Anantnag in collaboration with MHRFDC, Hansraj College during September 28- October 12, 2020.
26. Participated in a two-week Faculty Development Programme on “ Biomathematics” organised by PGDAV College, University of Delhi in collaboration with MHRFDC, Hansraj College during October 15-28, 2020.
27. Coordinated a two-days online training programme on “ICT Skills for Office Management” for the non teaching staff of colleges of Delhi University under IQAC, Hansraj College during Jan 21-22, 2021.
28. Coordinated a two-days online training programme on “Stress Management” for the non teaching staff of colleges of Delhi University under IQAC, Hansraj College during Jan 28-29, 2021.
29. Contributed as Member, NEP Task Force (IQAC) in organising one week online Faculty Development Programme on “ Roadmap for building New India with New Education Policy” organized by IQAC, Hansraj College in collaboration with MHRFDC, Hansraj College during July 21-25, 2021.
30. Participated in a one-week online Faculty Development Programme on “Multivariate analysis and Structural Equation Modeling” organized by Shivaji College, University of Delhi in collaboration with MHRFDC, Hansraj College during November 27- December 03, 2021.
31. Coordinated a two weeks (online) workshop on “Vedic Mathematics” organized by Shiksha Sanskriti Uthhan Nyas in collaboration with MHRFDC, Hansraj College during December 02- 13, 2021.
32. Coordinated a three-days Lecture Series on “NEP2020: Delhi University Undergraduate Curriculum Framework 2022” organised jointly by ILL, University of Delhi and MHRFDC, Hansraj College during January 27-29, 2022.
33. Participated in one day workshop on “Accelerate your research using Elsevier’s Scopus” organised by University of Delhi in collaboration with Elsevier Science on February 11, 2022.
34. Coordinated a two weeks (online) FDP on “Pedagogy for Higher Education” organised jointly by ILL, University of Delhi and MHRFDC, Hansraj College during February 21 to March 7, 2022.

35. Participated in two days online workshop on “Modeling Biological Systems” organised by the Centre for Bioinformatics and Computational Biology, Ashoka University under DBT, Govt of India during May 26-27, 2022.
36. Contributed as Programme Coordinator in two weeks (Online) Interdisciplinary Faculty Development Programme on " **Introduction to Python Programming**" organised by Mahatma Hansraj Faculty Development Centre in collaboration with DEEP-C, during 8<sup>th</sup> August – 19<sup>th</sup> August, 2022.
37. Participated in a one-week online Faculty Development Programme on “ Significance of Vedic Mathematics in Modern Era” organised by Aryabhatta College, University of Delhi and Shiksha Sanskriti Utthan Nyas in collaboration with MHRFDC, Hansraj College during December 5 - December 10, 2022.
38. Served as the Coordinator of a month Faculty Induction Programme (in blended mode) organised by MHRFDC, Hansraj College, University of Delhi during December 1-30, 2022.
39. Participated in one day webinar on 'Idea to Impact'organised by IIC, Hansraj College on Nov 28, 2024.
40. Served as Convener of two days International Conference on Recent Trends in Mathematics ICRTM-2025, sponsored by DST, at Hansraj College, during Feb 7-8, 2025
41. Participated in one week online FDP on ‘Cryptography and Information Security’ organised by MH-MMTTC in collaboration with Department of Mathematics, Hansraj College during July 10-16, 2025.

#### **Orientation/ Refreshers Courses attended**

- Orientation Programme OR-61, CPDHE (October 03-31, 2009)
- Refresher Course in Mathematics, Operational Research and Computer Science, CPDHE (December 12-31, 2011)
- Refresher Course in Mathematical Science, CPDHE, University of Delhi (June 06-27, 2017)
- Refresher Course on Calculus, ARPIT, MHRD, Govt. of India (Completed in March 2019)

#### **Research/ Innovation/ Undergraduate/ Internship Projects**

- UGC- sponsored Minor Research Project entitled “ A study of slant Hankel operators” (Date of sanction: March 2010, Date of final report submission: Jan 2012)
- Delhi University- sponsored Innovation project entitled “Critical and Scientific analysis on use of alternative medicines with practical approach and case studies” (Project Code: Hansraj College-313, Status: Completed in November 2016)
- Supervised the DST-sponsored (INSPIRE undergraduate programme) entitled “A study of Dengue and Chikungunya pattern across Delhi: a mathematical approach” during June-July 2018. ( Sanctioned to Ms. Yukti, Student, B.Sc(Hons.) Mathematics, Jesus and Mary College, University of Delhi)



- Mentored the two week internship programme of five M. Ed. Students of Jamia Millia Islamia at MHRFDC, Hansraj College during February 1- 12, 2021 under Field Internship Programme in Institutions for Teaching Subject-based Specialization.
- Mentored the four months research internship programme of two students of B.A. (Hons.) Economics at MHRFDC, Hansraj College during September 2021- December 2021 for carrying out the feedback analysis of the programmes conducted by the centre.

### Academic awards and distinctions

- Receiver of University Topper M.Bholanath **Gold Medal**, University of Delhi (2003)
- Receiver of Mrs. Manohar Lal Medal ( 'the most talented student of Mathematics' award), Janki Devi Memorial College, University of Delhi (2003)
- JAM qualified with Rank 1 (IIT, Delhi) (2003)
- JRF Awardee (2005)
- Received the best student in M.A/M.Sc. Mathematics award, St. Stephen's College, University of Delhi (2005)

### Contribution To Societies/ Committees/ Administrative work in the institution

#### Present administrative positions:

- **Nodal Officer, Viksit Bharat Ambassador Club, Hansraj College**
- **Member, IA Monitoring Committee, Hansraj College (2024-25)**
- **Member, IIC, Hansraj College (2023-24), (2024-25)**
- **Dell Faculty Champion (2023-24), (2024-25)**
- **Advisor, Mahatma Hansraj Faculty Development Centre, Hansraj College (May 17, 2023 - till date)** ; a prestigious NMTT centre of UGC. The objective of the centre is to identify skill deficits among the teaching community and organise national/international level programs like Faculty Development Programs, Induction Programs, Workshops, Symposia and Seminars etc. to bridge this gap. The centre also runs the multidisciplinary research journal of Hansraj College, Hansshodhsudha under its umbrella.  
**Served as Coordinator of MHRFDC, Hansraj College (April 1, 2019 - May 17, 2023) (under the prestigious PMMMNMTT Scheme of MoE, Govt. of India)**
- **Course Advisor for Community College Scheme Courses** of UGC running at Hansraj College
- **Advisor, e-Samvaad Centre**, a centre for digital content creation under the aegis of MHRFDC, Hansraj College
- **Associate Editor** of the college research journal Hansshodhsudha
- **Nodal Officer (SPOC) for SWAYAM** Local Chapter, Hansraj College
- **Coordinator of Skill Hub Centre** at Hansraj College, under Pradhan Mantri Kaushal Vikas Yojna of National Skill Development Corporation, Govt of India (2021-22)

#### Other assignments (since 2016):

1. Pi, The Mathematics Society: Convener (2017-18), Member (2016-17), Member (2018-19), Member (2019-20)



2. Women Development Cell: Member (2019-20), Convener (2017-18), Member (2016-17)
3. Gender Equality Cell: Convener (2017-18)
4. Students' Welfare Society: Member (2017-18, 2018-19)
5. Haritima, Environment Awareness Society: Member (2017-18)
6. 2018-19: Teacher in charge, Department of Mathematics, Hansraj College;  
Member of Admission Committee, Attendance Committee, Students' Welfare Committee,  
Purchase Committee, Hostel Committee, Discipline Committee.
7. ICT Enabling Committee/Portal Committee: Member (2019-20)
8. Coordinator, MHRFDC, Hansraj College (April 1, 2019 - May 17, 2023)
9. Member, NEP Task Force, Hansraj College (2022-23)
10. Criterion 2 Convener (NAAC, 2023-24), IQAC, Hansraj College
11. Secretary, Staff Council ( June 2023 - May 2025)

#### **Association With Schools/ Other Universities/Professional Bodies**

- Life Member of Bharata Ganita Parisad, University of Lucknow.
- Professional Member of Institute of Scholars, Karnataka, India.
- Reviewer, Plant Science Today.
- Reviewer of Proceedings of the National Academy of Sciences, India Section A: Physical Sciences
- Reviewer of International Journal of Basic and Applied Sciences, InSc, Karnataka, India.
- Member of the Academic Experts Committee of The Mathematics Teachers' and Students' Foundation, New Delhi, India.
- Life Member of Mathematics Teachers' Association (India).
- Visited Kulachi Hansraj Model School (Ashok Vihar) as subject expert for TGT Mathematics interviews on May 21, 2016.
- Visited SLS DAV Public School (Mausam Vihar) as subject expert for TGT & PRT Mathematics interviews on June 18, 2016.
- Visited Bal Bharati Public School (Pitampura) as a judge for the sub-themes "Mathematical Solutions in daily life" and "Transport and Communication" in the CBSE Regional Science Exhibition held during Dec 14-17, 2016.
- Served as a resource person in Mathematica-lab sessions in the ISPIRE Programme (DST) for school students, held at Hansraj College, University of Delhi, during December 12-16, 2017.

- Contributed as a panelist in the Panel discussion on 'Motivating Students to Pursue Studies in Higher Mathematics' at IMM Conclave, 2018 (Modern School, Barakhamba Road) on October 14, 2018.
- Visited Darbari Lal DAV Model School (Pitampura) as subject expert for PRT Mathematics interviews on May 11, 2019.
- Visited Kulachi Hansraj Model School (Ashok Vihar) as subject expert for TGT Mathematics interviews on May 18, 2019.
- Visited DAV Public School (Sahibabad) as subject expert for TGT Mathematics interviews on June 3, 2019.
- Visited DAV Public School (Sec 49, Gurugram) as subject expert for TGT Mathematics interviews on June 24, 2019.
- Served as a resource person in one week Faculty Development Programme on "Entailing vitality of ICT in Capacity Building of Faculties" (August 17 - 22, 2019) and took a session on "Government's initiatives towards promotion of e-learning" on August 22, 2019 at Dr. Shyama Prasad Mukherjee University, Ranchi (Jharkhand).
- Contributed as a panelist for the Discussion forum on '*Mathematics education (higher education) during the pandemic: Issues, challenges, and possible solutions*' in MTA Second Annual (online) conference 2020 on *Mathematics Education in Times of the COVID-19 Pandemic* hosted on September 5-6, 2020.
- Visited Darbari Lal DAV Model School (Pitampura) as subject expert for TGT and PRT Mathematics interviews on May 14, 2022.
- Served as a resource person for evaluating presentations in two sessions during one month Faculty Induction Programme organised by MHRFDC, Hansraj College on December 27 and 29, 2022.
- Served as a resource person in Teachers Training Workshop and took a session on "Measurements and Metric System" at the Human Resource Development Centre, Delhi Public School Society on February 12, 2023.
- Visited Darbari Lal DAV Model School (Pitampura) as subject expert for TGT and PRT Mathematics interviews on May 13, 2023.
- Visited Kulachi Hansraj Model School (Ashok Vihar) as subject expert for TGT Mathematics interviews on May 26, 2023.
- Visited DAV College Managing Committee, Chitra Gupta Road on June 15, 2023 as subject expert to interview candidates for the post of Assistant Professor in Mathematics for DAV Institute of Engineering & Technology, Daltonganj, Palamau, Jharkhand.
- Served as a resource person for evaluating participants' presentations during one month Faculty Induction Programme organised by MHRFDC, Hansraj College on July 18, 2023.
- Served as a judge in Inter Amity Mental Math Quiz 2023-24 on January 18, 2024.
- Served as a resource person for a Hands-on session on "Data Visualization and Research using Computer Algebra System: A step towards Viksit Bharat@2047" on March 18, 2024 at Mata Sundri College for Women, University of Delhi.

Certified that the information given above is true and verifiable through certificates and supporting documents.

Prof. (Dr.) Jyoti Bhola

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