



Criterion 3:- Research, Innovations and Extension

3.1. Background:

The Department of Chemistry of Dr. Harisingh Gour Vishwavidyalaya was established right from the inception of the University in July 1946. The Department holds the unique record of being the oldest and the biggest in central India. The Department made significant contributions to quality teaching and chemical research and technology under the stewardship of Prof. A. K. Bhattacharya, Dr. S. N. Banerjee, Prof. S. S. Nigam, and Prof. A. V. Mahajani and the trained (more than >1000 students have been awarded Ph.D. degree and over >1300 research papers have been published) are carrying out significant and excellent work elsewhere. Majority of the faculty members have visited the institutions of repute abroad and have participated in International and National conferences. The Department is equipped with state-of-the-art research laboratory required in modern science for carrying out practical wet chemistry and theoretical/computational studies. The department has been sponsored under UGC-SAP (Special Assistance Program) and DST-FIST (Fund for improvement of science & technology infrastructure).

3.2. Thrust area of Research-

Research groups in our department are dedicated to carrying out cutting edge research in basic and applied fields of chemistry including **Chemical Biology, Peptide and Nucleic Acid based Drug Design, Computer Aided Drug Design, Chiral Auxiliary based Asymmetric Synthesis, Asymmetric Catalysis, Synthesis of Hybrid Nanomaterials applicable to Photo Catalysis and Waste Water Treatment, Opto-electronic, Luminescent Nanomaterials, Depletion of Essential Metal ions of soil, Photo physical and Photocatalytic studies of Organic and Inorganic materials, Structural Chemistry, Crystallography and Supramolecular Beneficiation to name a few** along with the strong presence in Natural Product Chemistry, Material Science, Electrochemistry, Chemical Kinetics, Heterocyclic Chemistry, Coordination Chemistry to name a few. It is owing to the very active contribution of our faculty members for the cutting age scientific research, they are continuously obtaining support from various funding agencies, such as; **Madhya Pradesh Council of Science and Technology (MP-COST), University Grant Commission (UGC), Council of Scientific and Industrial Research (CSIR), Department of Science and Technology (DST), Science and Engineering Research Board (SERB), DBT and Indo-French Centre for the Promotion of Advanced Research (IFCPAR/CEFIPRA).** *Therefore, since last five years the faculty members are running the scientific projects worth Rs. ~7.00 Cr.*

3.3. Departmental instrumental (research) facilities-



Our department together with support with Sophisticated Instrument Centre (SIC) is equipped with the advanced state-of-the-art instrumentation facility such as UV-Vis Spectro photometer, FT-IR spectrophotometer, GLC, HPLC, Powder XRD, GC-MS (GC-TOF), HPLC-Mass spectrometer, BET surface area analyser, Electrochemical workstation, and Rheometer Single crystal XRD, NMR spectrometer (500 MHz), ICP-MS, SEM, TEM and AFM, Nano spray dryer, TGA-DTA, Laser-RAMAN Spectroscopy facilities stationed at different locations of the University.

3.4. Few Significant Selected Research contribution from the department (past five years):

The faculty members of our department have published research papers in highly reputed journals of international standards therefore actively engaged in scientific research activities in various institutes and in this university. They have devoted their life for quality research in past years and worked independently as a dedicated researcher. The impact factor range lies between 0.5-60.622. Few high impacts published peer-reviewed, international journals with are given bellow:

1. Pandey, M. D and Co-Authors *Chemical Reviews*, **2015**, 42, 8736–8834 I.F. : **60.622**
2. Das, K. and Co-Authors *ACS Nano*, 2016, 10, 10901–10911. I.F. : **15.882**
3. Chandra V and Co-Authors *Journal of Hazardous Materials*, 2018, 344, 576-584 I.F. : **10.588**
4. Joshi K.B and Co-Authors, *Bioresource Technology*, 2020, 319, 124129 I.F. : **9.642**
5. Ghosh Pand Co-Authors *ACS Applied Materials and Interfaces*, 2017, 9, 11651-11661. I.F. : **9.229**
6. Upadhyay N and Co-Authors *Environmental Chemistry Letters*, 2017; 15(1): 101-123 I.F. : **9.027**
7. Khan, F and Co-Authors *Journal of Colloid and Interface Science*, 2017, 505, 115-129 I.F. : **8.128**
8. Joshi K. B. and Co-Authors *Nanoscale*, 2015, 7, 20238-20248 I.F. : **7.790**
9. Ghosh P, and Co-Authors *Nanoscale* 2016, 8, 8160-8169. I.F. : **7.790**
10. Pandey A., Ghosh P. and Co-Authors *Biomaterials Science*, 2020, 8, 6730-6740. I.F. : **6.843**
11. Joshi K. B. and Co-Authors *Journal of Molecular Liquid* 2018, 249, 600, I.F. : **6.165**
12. Upadhyay N. and Co-Authors *Frontiers in Chemistry* 2017; 5:43 I.F.: **5.221**
13. Mishra A.P. and Co-Authors *Arabian Journal of Chemistry*, 2019, 12, , 1715-1721 I.F. : **5.165**
14. Ghosh P. and Co-Authors *ACS Applied Nano Materials* 2019, 2, 927 I.F. : **5.097**
15. Joshi K. B. and Co-Authors *ACS Infectious Diseases*, 2020, 6, 9, 2441–2450 I.F. : **5.084**
16. Deshmukh, M. M and Co-Authors *The Journal of Organic Chemistry*, 2017, 82, 289-301 I.F. : **4.849**
17. Joshi, K. B. and Co-Authors *Chemical Science*, 2021, DOI: 10.1039/D1SC04030H I. F: **9.825**

More information about faculty research can be obtained from their personal homepages.

3.5. PhD training and outcome:

In addition to the bachelor and master programs, the department provides a very vibrant Ph.D. program that is followed by a rigorous coursework in advanced topics in chemistry. Graduate students undertake challenging research projects towards their thesis. The aim is to produce independent, creative scientists who are ready to take on the scientific



challenges of the future. The department currently encourages the practices for weekly and monthly progress by group meeting between research scholars and faculty members is in the active practice in each research group. The outcome of such activity produced quality PhD and our students are currently working in abroad as postdoctoral fellow and glorifying the name of our department and hence University.

3.5. Distinguished Awards-

It is worth to mention here that our faculty members are the recipient of various national and international awards like R. D. Desai Award (Prof. S.N. Limaye, Prof. R. N. Yadava), K. A. Thakar award (Prof. F. Khan), INSA visiting fellows (Prof. A. P. Mishra, Prof. F. Khan), International Fellowships like Alexander von Humboldt Fellowship (Dr. Khashti Ballabh Joshi, Dr. Pushpal Ghosh), Commonwealth fellowship (Prof. Farid Khan), DAAD fellowship (Prof. A. K. Banerjee). Our faculty members and doctoral students have received various prestigious postdoctoral fellowships and worked/working in countries like Germany, France, South Korea, Japan, Russia, Spain, South Africa etc.

The alumni of this department have held high positions within and outside the country. Dr. A. Bhattacharya (Scientist, Mobil corporation, USA), Dr. G. S. Rao (Head, Analytical Division, BARC, Mumbai), Prof. P.L. Kachroo (Head, Department of Chemistry, Jammu University), Prof. P. K. Bhattacharya (Head, Department of Chemistry, M. S. University, Baroda), Prof. D. K. Banerjee (Dean, SES, JNU, New Delhi), Dr. G. Koul (Senior Scientist, IIM, Jammu), Dr. A. K. Guru (Director, FSL, MP), Dr. J. N. Mathur (In-charge, Radiochemistry Div. , BARC, Mumbai) are few to mention.

3.6. Faculty Profile

Faculty Profile		Research Interest
	Prof. Farid Khan Designation -Professor Dean, School of Chemical Science and Technology Vidwan ID - https://dhsgsu.irins.org/profile/48689	Nanoporous Materials, Nanocomposites, High Tc Superconductivity, Sensors, Supercapacitors and Electrochemistry
	Prof. (Mrs.) Archana Pandey Designation -Professor Head, Department of Chemistry Vidwan ID - https://dhsgsu.irins.org/profile/124865	Reaction mechanism, Chemical Dynamics, Release Kinetics of Drug Nanoparticles.
	Prof. A. P. Mishra Designation -Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/126732	Synthetic and Structural Inorganic Chemistry, Coordination Chemistry, Bioinorganic, Nano Materials, Ultrasonics.



	Prof. S. P. Shrivastava Designation -Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/132463	Synthetic Organic Chemistry, Drug Design and Molecular Modelling
	Prof. Vijay Verma Designation -Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/132442	Solid State and Material Chemistry
	Dr. Prof. Ratnesh Das Designation -Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/126696	Synthetic Organic Chemistry, Electrochemistry and Computational Chemistry
	Dr. Ritu Yadava Designation - Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/126632	Synthetic Organic Chemistry, Medicinal Chemistry
	Dr. K. K. Raj Designation -Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/132460	Coordination Chemistry-Synthesis and Characterization of Metal Complexes and MOFs.
	Dr. K. B. Joshi (Alexxander von Humboldt Fellow, Germany) Designation -Assistant Professor Department of Chemistry, DHSGSU Website: www.kbjhome.org Vidwan ID - https://dhsgsu.irins.org/profile/126620	Organic synthesis, solid and solution phase peptide synthesis, Nanotechnology, Medicinal Chemistry, Chemical Biology, Microscopic techniques
	Dr. Kalpataru Das Designation - Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/126215	Organic Synthesis, Asymmetric Synthesis, Catalysis, Green Chemistry, Synthesis of Organofluorine Compounds and Bio-Active Molecules.
	Dr. Sarita Rai Designation - Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/132812	Nanomaterials, Solid State Chemistry of Mixed Metal Oxides, Cements and Composite Materials
	Dr. Vimlesh Chandra Designation - Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/129976	Synthesis and Characterization of Hybrid Nano Materials for Application in Waste Water Treatment and Photo Catalysis
	Dr. Abhilasha Durgabanshi Designation - Assistant Professor Department of Chemistry, DHSGSU Vidwan ID - https://dhsgsu.irins.org/profile/126652	Development of new electrochemical detection cell for capillary zone electrophoresis, Chromatographic analysis of various toxicological, pharmaceutical, biomedical and environmental samples, analytical chemistry and applied chemistry



	Dr. Pushpal Ghosh (Alexxander von Humboldt Fellow, Germany) Designation- Assistant Professor Department of Chemistry, DHSGSU Vidwan ID- https://dhsgsu.irins.org/profile/120001	Optoelectronic nanomaterials, Green synthesis of energy efficient nanomaterials using ionic liquids
	Dr. Neeraj Upadhyay Designation- Assistant Professor Department of Chemistry, DHSGSU Vidwan ID- https://dhsgsu.irins.org/profile/125167	Reaction mechanism, Chemical Dynamics, Release Kinetics of Drug Nanoparticles.
	Dr. Milind Deshmukh Designation- Assistant Professor Department of Chemistry, DHSGSU Vidwan ID- https://dhsgsu.irins.org/profile/126564	Theoretical and Computational Chemistry, Quantum Chemistry, Catalysis, Non-covalent Interactions

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