




DEPARTMENT OF CHEMISTRY
DYAL SINGH COLLEGE, UNIVERSITY OF DELHI
FACULTY DETAIL



Title	Prof.	First Name	ANIL KUMAR	Last Name	NAIN	Photograph
Designation	PROFESSOR					
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Email	ak_nain@yahoo.co.in anilkumarnain@dsc.du.ac.in					
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Educational Qualifications						
Degree	Institution				Year	
B.Sc.	Jamia Millia Islamia (Central University), New Delhi				1990	
M.Sc. (Chemistry)	Jamia Millia Islamia (Central University), New Delhi				1992	
Ph.D. (Chemistry)	Jamia Millia Islamia (Central University), New Delhi				1996	
D.Sc. (Chemistry)	University of Allahabad, Allahabad				2007	
Career Profile						
⇒ Senior Research Fellow (SRF) , April 01, 1996 to March 31, 1998 (CSIR) at the Department of Chemistry, Jamia Millia Islamia, New Delhi.						
⇒ Research Associate (RA) , May 19, 1998 to April 30, 2003, (CSIR) at the Department of Chemistry, Jamia Millia Islamia, New Delhi.						
⇒ Project Officer , May 01, 2003 to March 2004, at National Board of Accreditation (NBA), All India Council for Technical Education (AICTE), New Delhi.						
⇒ Young Scientist Fellow , April 01, 2004 to March 31, 2007 under SERC Fast Track Young Scientist Scheme (DST), at the Department of Chemistry, Jamia Millia Islamia, New Delhi.						
⇒ Lecturer (Chemistry), November 01, 2004 to November 06, 2008, at Dyal Singh College, DU.						
⇒ Reader (Chemistry), December 07, 2008 to December 06, 2011, at Dyal Singh College, DU.						
⇒ Associate Professor (Chemistry), December 07, 2011 to July 17, 2018, at Dyal Singh College, DU						
⇒ Professor (Chemistry), July 18, 2018 to till date, at Dyal Singh College (University of Delhi).						
Administrative Assignments (From 1 st July 2019 onwards)						
Worked in various committees of the College and Department of Chemistry						

Areas of Interest / Specialization
<p>Molecular Interactions in Solution (Physical Chemistry)</p> <ul style="list-style-type: none"> • Biophysical Chemistry • Physicochemical studies of non-electrolyte multicomponent systems • Physicochemical studies of homoeopathic medicine formulations <p>Thermodynamic, physicochemical and acoustical studies of molecular interactions in binary and ternary solvent systems, extremely diluted solutions (Homoeopathic medicines) and solute-solute and solute-solvent interactions in solutions containing electrolytes/amino acids/carbohydrates/ drugs/surfactants by using physical properties such as density, viscosity, sound speed, refractive index, conductivity, etc., their excess functions and other derived parameters from these properties.</p>
Subjects Taught
<p>Physical Chemistry: At UG level</p> <p>Gaseous state, Liquid State, Solid State, Liquid Crystals, Chemical Bonding, Chemical Thermodynamics, Chemical Kinetics, Conductance, Electrochemistry, Solutions, Chemical Equilibria, Phase Equilibria, Ionic Equilibria, Adsorption, Catalysis, Photochemistry.</p>
Research Guidance
<p>Ph.D. Awarded under Supervision: 07</p> <ol style="list-style-type: none"> 1. Ms. Rajni Sharma (2011, as Co-Supervisor, Jamia Millia Islamia, New Delhi) Experimental and Theoretical Studies Molecular Interactions in Multicomponent Systems Containing Industrially Important Organic Solvents. 2. Ms. Renu Pal Probing Solute-Solute and Solute-Solvent Interactions in Amino Acid + Carbohydrate/Drug+ Water Systems Using Physicochemical Methods. 3. Ms. Monika Lather Physicochemical Studies of Interactions of Selected Amino Acids with Carbohydrates/Drugs in Aqueous Medium. 4. Ms. Preeti Droliya Physicochemical Studies of Molecular Interactions in Multicomponent Systems. 5. Ms. Neha Chaudhary Physicochemical Studies of Molecular Interactions in Multicomponent Solvent Systems Containing Ionic Liquids. 6. Ms. Jyoti Gupta Physicochemical Studies of Interactions of Selected Amino Acids in Aqueous-Drug Media. 7. Ms. Ankita Physicochemical Studies of Interactions in Solutions Containing Drugs in Mixed Aqueous Media. <p>Ph.D. students working under Supervision: 02</p> <ol style="list-style-type: none"> 1. Nidhi Physicochemical and Spectroscopic Studies of Molecular Interactions in Industrially Important Multi-Component Solvent Systems. 2. Soumya Thermophysical and Spectroscopic Studies of Molecular Interactions in Multicomponent Solvent Systems.

Research Articles Published in Refereed Journals: 183 (Scopus indexed: 140, Other: 43)

Citations: 4020 (Scopus) 4960 (Google Scholar) 4410 (Research Gate)

h-Index: 38 (Scopus) 41 (Google Scholar) 38 (Research Gate)

Research Publications (From 1st July 2019 onwards): 38

2025: 03

A. K. Nain and Nidhi, Insight into molecular interactions prevailing in N,N-dimethylformamide + alkyl acrylates mixtures at different temperatures: An experimental and theoretical investigation, *J. Chem. Thermodyn.*, 201, 107393 (2025).

Nidhi and **A. K. Nain**, Unveiling the intermolecular interactions in ethyl acetate + polyethylene glycol 200/300/400/600 binary mixtures by using densities, speeds of sound, excess properties and FTIR spectra at different temperatures, *J. Chem. Thermodyn.*, 201, 107391 (2025).

A. K. Nain, Nidhi and N. Chaudhary, Excess acoustic and volumetric properties of polyethylene glycol 200 + methyl/ethyl methacrylate binary mixtures at different temperatures: An experimental and theoretical study, *J. Chem. Thermodyn.*, 200, 107358 (2025).

2024: 04

A. K. Nain, N. Chaudhary, P. Droliya, R. K. Manchanda, A. Khurana and D. Nayak, Probing the physicochemical behaviour of acidum aceticum homoeopathic dilutions at ambient temperatures by using volumetric, acoustic and viscometric methods, *Organic & Medicinal Chem. I.J.*, 13, 555872 (2024).

Nidhi and **A. K. Nain**, Volumetric and ultrasonic studies of molecular interactions in binary mixtures of N,N-dimethylacetamide with some polyethylene glycols at temperatures from 293.15 to 323.15 K, *Discover Chem.*, 1, 7 (2024).

A. K. Nain, N. Chaudhary, A. Khurana, R. K. Manchanda and D. Nayak, Physicochemical behaviour of homoeopathic dilutions of ammonium carbonicum at ambient temperatures: Volumetric, ultrasonic and viscometric study, *J. Mol. Chem.*, 4, 698 (2024).

Nidhi and **A. K. Nain**, Volumetric, acoustic and spectroscopic studies of molecular interactions in 1-butyl-3-methylimidazolium hexafluorophosphate + ethyl/propyl/n-butyl acetate binary mixtures at different temperatures, *J. Chem. Thermodyn.*, 198, 107339 (2024).

2023: 02

A. K. Nain, N. Chaudhary, A. Khurana, R. K. Manchanda and D. Nayak, Volumetric, acoustic and viscometric studies on the behaviour of homoeopathic formulations of ammonium causticum at different temperature, *Organic & Medicinal Chem. I.J.*, 12, 555835 (2023).

A. K. Nain, N. Chaudhary, A. Khurana, R. K. Manchanda and D. Nayak, Physicochemical studies of homoeopathic formulations of ammonium aceticum by using volumetric, acoustic and viscometric measurements at different temperatures, *Organic & Medicinal Chem. I.J.*, 12, 555830 (2023).

2022: 03

A. K. Nain and D. Chand, Evaluation and analysis of Kirkwood-Buff integrals of 1,4-dioxane + aromatic hydrocarbon binary mixtures using inversion procedure and regular solution theory from ultrasonic speed and density data, *J. Acoust. Soc. India*, 49 36-47 (2022).

A. K. Nain, Study of intermolecular interactions in binary mixtures of methyl acrylate with benzene and methyl substituted benzenes at different temperatures: An experimental and theoretical approach, *Chin. J. Chem. Eng.*, 44, 222-246 (2022).

N. Chaudhary and **A. K. Nain**, Densities, ultrasonic speeds, refractive indices, excess and partial molar properties of polyethylene glycol 200 + benzyl methacrylate binary mixtures at temperatures from 293.15 to 318.15 K, *J. Mol. Liq.*, 346, 117923, (2022).

2021: 09

N. Chaudhary and **A. K. Nain**, Correlation between intermolecular interactions and excess properties of polyethylene glycol 400 + benzyl methacrylate binary mixtures at temperatures from 293.15 to 318.15 K, *J. Mol. Liq.*, 340, 116866 (2021).

A. K. Nain and D. Chand, Correlation between molecular interactions and excess thermodynamic parameters of binary mixtures, *J. Pure Appl. Ultrason.*, 43, 8-16 (2021).

Y. Bisht and **A. K. Nain**, Solute-solute and solute-solvent interactions of *l*-methionine, *l*-threonine and *l*-histidine in aqueous-carbohydrate solutions using Kirkwood-Buff theory: A theoretical study, *Organic & Medicinal Chem. I.J.*, 11, 555806 (2021).

N. Chaudhary and **A. K. Nain**, Physicochemical studies of intermolecular interactions in 1-butyl-3-methylimidazolium tetrafluoroborate + benzonitrile binary mixtures at temperatures from 293.15 to 318.15 K, *Phys. Chem. Liq.*, 59, 358-381 (2021).

A. K. Jangir, **A. K. Nain** and K. C. Kuperkar, Insight into structural properties and molecular interactions of maline (choline chloride + malonic acid) and 1,4-butanediol based pseudo-binary mixture: A thermophysical, spectral, and simulation portrayal, *J. Mol. Liq.*, 334, 116050 (2021).

Ankita and **A. K. Nain**, Probing interactions and hydration behaviour of drug sodium salicylate in aqueous solutions of D-xylose/L-arabinose: Volumetric, acoustic and viscometric approach, *J. Mol. Liq.*, 333, 115985, (2021).

A. K. Nain, Insight into intermolecular interactions in benzonitrile + methyl acrylate/ethyl acrylate/*n*-butyl acrylate/*t*-butyl acrylate binary mixtures at temperatures from 293.15 to 318.15 K: Ultrasonic and viscometric study, *J. Mol. Liq.*, 331, 115599 (2021).

A. K. Nain, Physicochemical study of intermolecular interactions in binary mixtures of acetonitrile with alkyl acrylate monomers at temperatures from 293.15 to 318.15 K by using ultrasonic speed and viscosity data, *J. Chem. Thermodyn.*, 156, 106387 (2021).

A. K. Nain, Interactions of some α -amino acids with antibacterial drug gentamicin sulphate in aqueous medium probed by using physicochemical approaches, *J. Mol. Liq.*, 321, 114757 (2021).

2020: 16

Ankita, D. Chand and **A. K. Nain**, Insight into solute-solute and solute-solvent interactions of semicarbazide hydrochloride in aqueous-D-glucose/D-sucrose solutions at temperatures from 293.15 to 318.15 K, *Chin. J. Chem. Eng.*, 28, 3086-3095 (2020).

A. K. Nain, Insight into solute-solute and solute-solvent interactions of *l*-proline in aqueous-D-xylose/L-arabinose solutions by using physicochemical methods at temperatures from 293.15 to 318.15 K, *J. Mol. Liq.*, 318, 114190 (2020).

Ankita and **A. K. Nain**, Viscosity *B*-coefficients and thermodynamics of viscous flow of *l*-arginine/*l*-histidine in aqueous-gentamicin sulphate at temperatures from 298.15 to 318.15 K, *Organic & Medicinal Chem. I.J.*, 10, 555778 (2020).

N. Chaudhary and **A. K. Nain**, Volumetric, acoustic and viscometric studies intermolecular interactions in polyethylene glycol 400 + alkyl acrylate binary mixtures at temperatures from 293.15 to 318.15 K, *Phys. Chem. Liq.*, 58, 736-759 (2020).

A. K. Nain, Volumetric and ultrasonic study of *l*-arginine/*l*-histidine and gentamicin sulphate in aqueous medium at different temperatures, *J. Mol. Liq.*, 315, 113736 (2020).

P. Drolia, D. Chand and **A. K. Nain**, Experimental and theoretical studies of transport and optical properties of binary mixtures of acetonitrile with some alkyl methacrylates at temperatures from 293.15 to 318.15 K, *Indian J. Chem. A*, 59, 1457-1469 (2020).

N. Chaudhary and **A. K. Nain**, Densities, ultrasonic speeds, viscosities, refractive indices and excess properties of 1-butyl-3-methylimidazolium tetrafluoroborate + N-methylacetamide binary mixtures at different temperatures, *J. Chem. Eng. Data*, 65, 1447-1459 (2020).

Ankita, D. Chand and **A. K. Nain**, Molecular interactions of drug semicarbazide hydrochloride in aqueous-D-xylose/L-arabinose solutions at different temperatures: Volumetric, acoustic and viscometric study, *J. Chem. Thermodyn.*, 146, 106106 (2020).

N. Chaudhary and **A. K. Nain**, Densities, ultrasonic speeds, viscosities, refractive indices, excess and partial molar properties of binary mixtures of 1-butyl-3-methylimidazolium tetrafluoroborate with formamide at temperatures from 293.15 to 318.15 K, *J. Mol. Liq.*, 305, 112816 (2020).

J. Gupta, D. Chand and **A. K. Nain**, Study to reconnoiter solvation consequences of *l*-arginine/*l*-histidine and sodium salicylate in aqueous medium probed by physicochemical approach in the temperature range (293.15 – 318.15) K, *J. Mol. Liq.*, 305, 112848 (2020).

J. Gupta and **A. K. Nain**, Correlation between physicochemical properties and non-covalent interactions involving *l*-arginine/*l*-histidine and semicarbazide hydrochloride at temperatures from 293.15 to 318.15 K, *J. Chem. Thermodyn.*, 144, 106067 (2020).

J. Gupta, D. Chand and **A. K. Nain**, Insight into interactions of *l*-arginine/*l*-histidine with drug betaine hydrochloride in aqueous medium at different temperatures by using physicochemical methods, *Organic & Medicinal Chem. I.J.*, 9, 555763 (2020).

Ankita and **A. K. Nain**, Study of solvation behavior and interactions of drug betaine hydrochloride in aqueous-D-xylose/L-arabinose solutions at different temperatures by using volumetric, acoustic and viscometric methods, *J. Chem. Thermodyn.*, 143, 106046 (2020).

Ankita and **A. K. Nain**, Study on the interactions of drug isoniazid in aqueous-D-xylose/L-arabinose solutions at different temperatures using volumetric, acoustic and viscometric approaches, *J. Mol. Liq.*, 298, 112086 (2020).

Ankita and **A. K. Nain**, Solute-solute and solute-solvent interactions of drug sodium salicylate in aqueous-glucose/sucrose solutions at temperatures from 293.15 to 318.15 K: A physicochemical study, *J. Mol. Liq.*, 298, 112006 (2020).

N. Chaudhary and **A. K. Nain**, Volumetric, ultrasonic, viscometric and refractive index studies of molecular interactions in binary mixtures of 1-butyl-3-methylimidazolium tetrafluoroborate with methyl acrylate at temperatures from 293.15 to 318.15 K, *J. Mol. Liq.*, 297, 111890 (2020).

2019: 01

J. Gupta and **A. K. Nain**, Study of solute-solute and solute-solvent interactions of gentamicin sulphate in aqueous-*l*-asparagine/*l*-glutamine solutions at different temperatures by using physicochemical methods, *J. Mol. Liq.*, 293, 111547 (2019).

Conference Organization/ Presentations (From 1st July 2019 onwards)

None

Research Projects (Major Grants/Research Collaboration) (From 1st July 2019 onwards)

Title of the Project: Physicochemical studies of homoeopathic drug formulations by using volumetric, acoustic, viscometric, optical and conductometric measurements

Position in Project: Principal Investigator.

Period: 2017-2024 (Completed) **Grant Utilized:** 36.4278 Lakhs

Funding Agency: Central Council for Research in Homoeopathy (CCRH)

Awards and Distinctions (From 1st July 2019 onwards)

- ⇒ **Included in the World's Top 2% Scientists 2020** released on basis of research analysis by Stanford University, USA with **Global Rank 227** out of 55,697 researchers in Chemical Engineering Category (**more exactly in the top 0.41% scientists**).
- ⇒ **Included among 18 researchers from University of Delhi** in the **World's Top 2% Scientists 2020** released on basis of research analysis by Stanford University, USA. Ranked at **2nd position among these DU researchers** in C-Score ranking of all fields.
- ⇒ **Included in the World's Top 2% Scientists 2021** released on basis of Scopus data of research analysis by Stanford University, USA with **Global Rank 343** out of 66,189 researchers in Chemical Engineering Category (**more exactly in the top 0.51% scientists**).
- ⇒ **Included among 33 researchers from University of Delhi** in the **World's Top 2% Scientists 2021** released on basis Scopus data of research analysis by Stanford University, USA. Ranked at **2nd position among these DU researchers** in C-Score ranking of all fields.
- ⇒ **Included in the World's Top 2% Scientists 2022** released on basis of Scopus data of research analysis by Stanford University, USA with **Global Rank 203** out of 53,348 researchers in Chemical Engineering Category (**more exactly in the top 0.38% scientists**).
- ⇒ **Included among 22 researchers from University of Delhi** in the **World's Top 2% Scientists 2022** released on basis Scopus data of research analysis by Stanford University, USA. Ranked at **2nd position among these DU researchers** in C-Score ranking of all fields.
- ⇒ **Included in the World's Top 2% Scientists 2023** released on basis of Scopus data of research analysis by Stanford University, USA with **Global Rank 249** out of 72,674 researchers in Chemical Engineering Category (**more exactly in the top 0.35% scientists**).
- ⇒ **Included among 26 researchers from University of Delhi** in the **World's Top 2% Scientists 2023** released on basis Scopus data of research analysis by Stanford University, USA. Ranked at **2nd position among these DU researchers** in C-Score ranking of all fields.
- ⇒ **Included in the World's Top 2% Scientists 2024** released on basis of Scopus data of research analysis by Stanford University, USA with **Global Rank 258** out of 79,314 researchers in Chemical Engineering Category (**more exactly in the top 0.325% scientists**).
- ⇒ **Included among 39 researchers from University of Delhi** in the **World's Top 2% Scientists 2024** released on basis Scopus data of research analysis by Stanford University, USA. Ranked at **4th position among these DU researchers** in C-Score ranking of all fields.
- ⇒ Ranked in **AD Scientific index 2021** rankings of the world based on Google Scholar data of nearly ~1 million researchers from all subject areas. I am ranked **26th in University of Delhi; 1446th in all India; 12279th in Asia** and **88677th in the world**.

- ⇒ Ranked in **AD Scientific index 2022** rankings of the world based on Google Scholar data of nearly **~1.2 million researchers from all subject areas**. I am ranked **18th in University of Delhi; 1319th in all India; 12733th in Asia** and **101526th in the world**.
- ⇒ Ranked in **AD Scientific index 2023** rankings of the world based on Google Scholar data of nearly **~1.6 million researchers from all subject areas**. I am ranked **21th in University of Delhi; 1502th in all India; 14917th in Asia** and **114382th in the world**.
- ⇒ Ranked in **AD Scientific index 2024** rankings of the world based on Google Scholar data of nearly **~1.8 million researchers from all subject areas**. I am ranked **29th in University of Delhi; 1923th in all India; 18623th in Asia** and **126270th in the world**.

Association With Professional Bodies

- ⇒ Member in the **Editorial Advisory Board** of *Journal of Chemical Thermodynamics*, Elsevier Ltd., The Netherlands (2016 onwards).
- ⇒ **Associate Editor** in the *Organic and Medicinal Chemistry International Journal*, Juniper Pub., USA.
- ⇒ Member **Departmental Research Committee** in the Department of Chemistry, *Sir. J.C. Bose University of Science and Technology*, Faridabad (2019-20).
- ⇒ Member in the **Board of Associate Editors** of the *Journal of the Indian Chemical Society* (Physical Chemistry Section), ICS, Kolkata (2008-2010).
- ⇒ **Assistant Editor** of the *Journal of the Acoustical Society of India*, NPL, New Delhi (2009-14).
- ⇒ Member in the **Publication Committee** of the *Journal of Pure and Applied Ultrasonics*, Ultrasonics Society of India (USI), NPL, New Delhi (2007-2011).
- ⇒ Member in the **Executive Council** of the **USI**, NPL, New Delhi (2009-2011).
- ⇒ **Life Fellow** (LF-93) of the **Ultrasonic Society of India**, NPL, New Delhi.
- ⇒ **Life member of the**
 - *Ultrasonic Society of India* (Membership No. LM – 120) (2001-2010)
 - *Indian Council of Chemists* (Membership No. LF – 575)
 - *Acoustical Society of India* (Membership No. LM – 567)
 - *Indian Chemical Society* (Membership No. F/6244 LM, 2003)
 - *Indian Society of Analytical Scientists* (Membership No. LM-2071)
 - *Society for Materials Chemistry* (Membership No. LM-1841)

Other Activities like MOOCs/ Patents, etc. (From 1st July 2019 onwards)

- ⇒ **Reviewer of Research Papers for Journals: 60 Journals**
 - Foreign Journals: 51
 - Indian Journals: 09
- ⇒ **Evaluator and Examiner of Ph.D. theses of various Universities: 10**



Signature of Faculty Member