GGSIPU Year Book 2025-2026
University School of Basic and Applied Sciences
(Period: 1st August 2025- 31st July 2026)

a) Updated profile of your School/Centre/Department (250 words)

The University School of Basic and Applied Sciences (USBAS) at GGS IP University is one of the first schools of the University and was established in 1999 and developed in the early years of the University. The USBAS played a key role in supporting technical programmes of various schools of study of GGS IP University. The activity and focus of USBAS can be presented in a nutshell:

The focus of USBAS is in three areas (a) Teaching to Engineering students in various USS, (b) Teaching our own students at various levels such as B.Sc./M.Sc. in Physics, Chemistry and Mathematics, and Ph.D. in Physics, Chemistry and Mathematics, (c) Strong research activities.

b) Programmes & Courses

- B.Sc. / M.Sc. Dual Degree in Physics, Chemistry, Mathematics
- Ph.D. in Physics, Chemistry, Mathematics

c) Strength of Faculty (18)

- The Faculty of USBAS teaches their own students in B.Sc./M.Sc. Dual Degree in Physics, Chemistry, and Mathematics and Ph.D. programs Physics, Chemistry, and Mathematics
- Teaching: The Faculty of USBAS teaches the 1st Year students of other Engineering USS: USICT, USCT, USBT.
- Research: The USBAS Faculty has very strong Research activities. Their focus currently is in the areas: Two dimensional systems and their applications, ferroelectric materials, solar photovoltaics, renewable energy, foundations of quantum mechanics, quantum information, Multifunctional hybrid nanomaterials, Plasmonics, Nanocatalysis, Water purification, SERS, Gas sensing, Thin film transistor, ion beam technology, thermoelectrics: theory, materials, devices, magnetic materials, mesoscopic condensed matter physics, quantum heterostructures, DFT studies of Molecules, Atomic and Molecular clusters, medicinal and natural products chemistry, Bioorganic Chemistry, nanomedicine, drug delivery & imaging, Mesoporous systems, nanocomposites, Polymer Chemistry, Green Composites, coordination chemistry, synthetic main group and organometallic chemistry and metal ion catalysed / promoted organic synthesis, nanofluids, Differential geometry, fuzzy logic, nonlinear dynamics, Soft Computing.

d) Students Intake (Programme wise)

- B.Sc. / M.Sc. Dual Degree in Physics (60), Chemistry (60), Mathematics (60)
- Ph.D. (as per available seats)

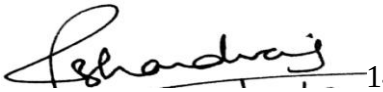
e) Additional courses introduced in 2025-2026

None

f) Research Projects/ Grants (1 August 2025 to 31 July 2026)

- **Prof. Rashmi Bhardwaj**

NBHM Project "Development of Mathematical Modelling and Numerical Simulation of Carbon Nano Tube (CNT) based flow of Nanofluid (Nano Coolant) using Lattice Boltzmann Method" in 2022 with Rs. 16.809 Lakh grant for February 2022- March 2026 from National Board of Higher Mathematics (NBHM), Department of Atomic Energy, Govt. of India.



14.10.2026

- **Prof. Neeleshwar and Dr. Anjana Bagga**
  SERB SURE Project "Disorder-induced enhancement of thermoelectric properties of a random array of SnSe quantum dots" in 2023 with Rs. 29.964 Lakh grant for 2023-2026 from SERB, DST

- **Dr. Puja Seth**
  WISE –SCOPE Project from DST in 2025 with Rs. 43.53 Lakh grant for 2025-2028 from DST.

g) Research Publications by the faculty

Prof. Shruti Aggarwal

- Tiwari, A., & Aggarwal, S. (2026). Exergy analysis and predictive modelling of a hybrid solar photovoltaic thermoelectric collector for refrigeration application. *International Journal of Exergy*, 51(2), 96-113.
- Seth, P., Soni, A., & Aggarwal, S. (2026). A review on the advancements in tissue-equivalent TL and OSL phosphor materials for radiation dosimetry. *Radiation Physics and Chemistry*, *247*, 113919.

Prof. Yogesh Kumar Tyagi

- Prakash, B., Saxena, A., Tyagi, Y. K., Singh, I. P., & Kumar, A. (2026). Natural ingredients-based pyrotechnic aerosol forming composite for quick fire extinguishment. *Process Safety and Environmental Protection*, *216*, 109202.

Prof. Satyabrata Mohapatra

- Singh, A., Vats, M., Mohapatra, S., Tomar, M., Chowdhuri, A., & Singh, V. (2026). High performance low temperature indium doped mesoporous tin oxide based NO_2 sensor. *Journal of Alloys and Compounds*, *1073*, 189056.

Prof. Shipra Mital Gupta

- Pandey, S., Gupta, S. M., & Sharma, S. K. (2025). Detection of Manganese (II) by PVP-AgNPs for water monitoring. *Environmental Monitoring and Assessment*, *197*, Article 1238.

Mr. Mukesh Kumar

- Kumar, M. (2025). Study of spectral brightness of THz radiation produced by longitudinally polarized harmonic undulator. *Journal of Optics*, 1, 1–12.

Prof. Ram Shankar Gupta

- Rani, S., Gupta, R. S., & Suh, Y. J. (2026). Yamabe and Ricchi solitons on Vaidya spacetime. *International Journal of Geometric Methods in Modern Physics*, *23*(8), Article 2550218.

- Goel, G., & Gupta, R. S. (2026). Weingarten osculating surfaces of non-null curves in Minkowski 3-space. *Honam Mathematical Journal*, *2*(2), 369–388.

Prof. Leena Khanna

- Khanna, P., Mittal, K., Bhutani, C., Singh, A., Talwar, S., & Khanna, L. (2026). A recent review on aqua mediated synthesis of DHPMs via the Biginelli reaction. *Current Organic Chemistry*, 30(7), 283–294.
- Nkosi, A. K., Girgis, A. S., Samir, A., Morsy, M. A., Shaban, A. M., Fayad, W., Soliman, A. A. F., Williams, C. T., Mori, S., Khanna, L., Verbeck, G. F., & Panda, S. S. (2026). Multifunctional curcumin-inspired 3,5-diarylidene-4-piperidones: Design, synthesis, biological evaluation and computational mechanistic studies. *Pharmaceuticals*, *19*(6), Article 935.

- Mansi, Yadav, S., Priyanshu, Chanana, P., Khanna, P., Bhutani, C., & Khanna, L. (2026). Novel coumarin-1,2,3-triazole-isatin hybrids: design, synthesis, in-vitro, in-silico and SAR study for antimicrobial activity and α-glucosidase inhibition. *Future Medicinal Chemistry, 18*(13), 1713–1729.

Prof. Vaishali Singh

- Singh, A., Vats, M., Mohapatra, S., Tomar, M., Chowdhuri, A., & Singh, V. (2026). High performance low temperature indium doped mesoporous tin oxide based NO_2 sensor. *Journal of Alloys and Compounds, 1073*, 189056.

Prof. Rashmi Bhardwaj

- Sangwan, V., Bhardwaj, R., Alfaro, M., Soto-Bubert, A., & Acevedo, R. (2025). Non-linear AI based viscosity prediction for binary brine data. *Chemical Thermodynamics and Thermal Analysis, 20*, 100231. 1-11.
- Soto-Bubert, A., Bhardwaj, R., & Acevedo, R. (2025). Viscosity model of KCl-NaCl-H_2O and $CaCl_2$-NaCl-H_2O brines in the temperature range 273.15 to 333.15 K. *Chemical Thermodynamics and Thermal Analysis*, *21*, 100253.
- Garg, S., & Bhardwaj, R. (2026). Is your bank financially stable? Inspection of financial health of banks using the novel approach RAAS. *International Journal of Mathematics in Operational Research*, 156502. Advance online publication.
- Inderjeet, & Bhardwaj, R. (2025). An improved class of Newton Raphson method for the numerical simulation of nonlinear equations. *Palestine Journal of Mathematics*, *14*(4), 104–108.
- Inderjeet, & Bhardwaj, R. (2025). A new variant of secant technique for simulation of nonlinear equations. *Journal of Interdisciplinary Mathematics*, *28*(8), 2867–2876.
- Sangwan, V., Bhardwaj, R., Soto-Bubert, A., & Acevedo, R. (2026). Boosting approach to brine viscosity estimation: Binary system development. *Chemical Thermodynamics and Thermal Analysis*, *21*, 100273.
- Sangwan, V., Bhardwaj, R., Soto-Bubert, A., & Acevedo, R. (2026). Ensemble machine learning models for ternary electrolyte viscosity prediction. *Chemical Thermodynamics and Thermal Analysis, 21*, 100278.
- Inderjeet, & Bhardwaj, R. (2026). A new variant of Simpson's method with accelerated sixth order of convergence. *Palestine Journal of Mathematics*, *15*(1), 120–128.
- Xue, X., Bhardwaj, R., Khalaf, O. I., Sangwan, V., & Sharma, S. (2026). Fractal memory and deep learning: A new paradigm for stock market prediction. *Egyptian Informatics Journal*, *33*, Article 100916.
- Sharma, S., Bhardwaj, R., & Datta, D. (2026). Hybrid quantum-classical variational reconstruction of CFD fields using VQAs. *Boletim da Sociedade Paranaense de Matemática*, *44*(7), 1–17.
- Yadav, E., & Bhardwaj, R. (2026). Optimization of decision support system using dynamic rough set and machine learning in complex dynamic environments. *Boletim da Sociedade Paranaense de Matemática*, *44*(7), 1–14.
- Sharma, S., Bhardwaj, R., & Datta, D. (2026). Quantum graph-based modelling of multi-step phase dynamics in coupled oscillator networks. *Boletim da Sociedade Paranaense de Matemática*, *44*(7), 1–20.
- Kansal, D., & Bhardwaj, R. (2026). Medical image enhancement using Genetic Optimization Algorithm. *Boletim da Sociedade Paranaense de Matemática*, *44*(14), 1–15.
- Sangwan, V., & Bhardwaj, R. (2026). Quantum-Swarm Hybrid Framework for Automated Hyperparameter Optimization in Boosting Algorithms for Cardiac Disease Prediction. *Boletim da Sociedade Paranaense de Matemática*, *44*(14), 1–10.
- Bhardwaj, R., & Sangwan, V. (2026). Bayesian additive and random subspace ensemble models enhanced by PSO for groundwater irrigation quality analysis. *Energy Nexus*, *22*, Article 100719.
- Sangwan, V., Bhardwaj, R., Soto-Bubert, A., & Acevedo, R. (2026). Machine-learning-based viscosity prediction for ternary $CaCl_2$-NaCl-H_2O and KCl-NaCl-H_2O brine systems. *Chemical Thermodynamics and Thermal Analysis*, *23*, 100353.

Prof. Abha Aggarwal

- Kaur, S., Singh, A., & Aggarwal, A. (2026). Optimal portfolio construction with fuzzy least square support vector machines and conditional value-at-risk: A risk-adjusted approach. *International Journal of System Assurance Engineering and Management*, *17*(4), 1072–1106.
- Kaur, S., Singh, A., & Aggarwal, A. (2025). A novel fuzzy multi-class support vector machine: An application to asset selection and portfolio optimization using the conditional value-at-risk model. *Computational Economics, 16*(1-46).
- Kaur, S., Sehgal, R., Singh, A., & Aggarwal, A. (2026). Asset shortlisting via fuzzy support vector machines for portfolio optimization model with second-order stochastic dominance criterion. *Uncertainty Discourse and Applications, 3*(1), 89–106.

Prof. Gulshan Kumar

- Dahiya, J., Narula, A. K., & Kumar, G. (2025). Unveiling the role of silica sulfuric acid and cellulose sulfuric acid in organic synthesis: a comprehensive review, *Discover Chemistry*, 2, 200.
- Dahiya, J., Narula, A. K., & Kumar, G. (2025). Triazoles in the Carbohydrate World: Unlocking Multifunctional Glycohybrids. *Chemistry and Materials*, *4*(3), 79–98.
- Kumar, K., Tyagi, U., Sirohi, S., Maity, S. K., Singh, S., Roy, D., & Kumar, G. (2026). Multi-stage thermal degradation of food waste-derived carbonized biomass: Advanced kinetic and mechanistic insights. *Journal of the Indian Chemical Society*, *103*(5), 2667-2847.
- Kumar, R., Park, K., Kumar, G., & Seo, J. (2026). Current trends in biodegradable plastics for barrier, active, and intelligent packaging: a review. *Polymer Bulletin*, *83*, 1436-2449.
- Kumar, K., Maity, S. K., Singh, S., Pani, B., Roy, D., & Kumar, G. (2026). Toward greener energy storage electrodes: Hierarchically engineered rice straw-derived activated carbon integrated with SnO_2/ZnO binary oxides for high-performance supercapacitors. *Diamond & Related Materials*, 165, 113594.
- Dahiya, J., Narula, A. K., & Kumar, G. (2026). Heteroatom modified carbohydrate scaffolds in drug discovery. *Discover Chemistry*, *3*, 328.

Dr. Arif Ali Khan

- Arora, G., Priya, & Khan, A. A. (2026). Selective cyclisation of 2-(2-hydroxy-phenyl)-2,3-dihydro-1H-quinazolin-4 one with formaldehyde and isolation of two isomeric oxazines. *Oriental Journal of Chemistry*, *42*(2), 412–422.

h) Awards, Honors, Fellowships, Achievements of School, Students and Faculty

- **Prof. Satyabrata Mohapatra:** Figured in ***World's Top 2% Scientists in Applied Physics*** for the sixth consecutive year with Career All India Rank # 107 by *Stanford University, USA* & Elsevier (2025)
- **Prof. Satyabrata Mohapatra:** Figured in ***Top Scholars*** with All India Rank # 12 (Lifetime)& World Rank #173 (Lifetime) in *Nanostructure*, All India Rank # 45 (Lifetime) & World Rank # 381 (Lifetime) in *Optical Properties* by *ScholarGPS* (2025)
- **Prof. Satyabrata Mohapatra:** ***Outstanding Researcher Award***, GGS Indraprastha University (2025)
- **Prof. Satyabrata Mohapatra:** ***Expert Member, Selection Committee***, ***INSPIRE Faculty Fellowship*** (IFF) Programme of DST
- **Prof. Satyabrata Mohapatra: joined as** ***Associate Editor***, ***Surface Review and Letters*** (World Scientific Publishing) (2026)
- **Prof. Rashmi Bhardwaj:** First Position in Research Track, Analytics Global Conference 2026 (13-14 March 2026, Kolkata) - Appreciation Certificate with cash prize of Rs. 10,000/-
- **Vinita Sangwan:** Best Research Paper Award at International Conference on Wetlands and Water Resources for Sustainable Development held at NIT-Patna (29.12.2025-31.12.2025)
- **Kajal Chaudhary:** Best Oral Presentation Award at International Conference on Mathematical Sciences and Computational Intelligence held at PGDAV College, University of Delhi. (20.02.2026-22.02.2026)

i) Placement Details

The Programme B.Sc. / M.Sc. (Physics, Chemistry and Mathematics) Dual Degree have been started from the Academic Session 2024-25 and the first batch will be passing out in 2028-29.

j) Academic activities and events

National Science Day-2026

National Science Day is celebrated in India every year on **28 February** to commemorate the discovery of the **Raman Effect** by the eminent Indian physicist **Sir C. V. Raman** in 1928. He was awarded the **Nobel Prize in Physics in 1930** for this remarkable discovery.

The day highlights the importance of **science, scientific thinking, research, and innovation** in the development of the nation. It encourages students and researchers to develop curiosity, creativity, and a problem-solving approach. National Science Day reminds us that scientific knowledge and innovation play a vital role in addressing challenges related to **health, environment, energy, agriculture, and sustainable development**. It inspires young minds to pursue scientific inquiry and contribute to the progress of society and the nation.

University School of Basic and Applied Sciences (USBAS) , GGSIPU celebrates the occasion through **science exhibitions, lectures, quizzes, demonstrations, poster competitions, and seminars**.

In year 2026 the official theme for National Science Day 2026 "Women in Science: Catalysing Viksit Bharat" announced by the Department of Science and Technology. Our School USBAS celebrated this day and aliened the programme with the above given theme. USBAS had two invited talk by chief guest of the programme Prof. Avinash C. Sharma, Director, IUAC and Guest of honour Shri Surender S. Ghonkrokta, Retd. IAS and 20 scientific posters participated by different USS students and faculty members to show case their scientific research. This year USBT also join USBAS to celebrate National Science Day-2026.

Glimpse of the National Science day-2026 celebrated by USBAS.





k) Community Outreach Initiatives

USBAS Under Graduate Students (B.Sc./ M.Sc. (Dual Degree) programme) actively participated in various NSS initiatives including the Plantation Drive, Cleanliness Drive, world Prosthodontist Day Walkathon, and My Bharat Budget Quiz. Through these activities, students promoted environmental awareness, cleanliness, health, and responsible citizenship. Together, they reflected the true spirit of NSS, GGSIPU| USBAS NSS Cell.



L) Student-centric Extracurricular activities

Invited talk organized by USBAS on 20.01.2026 – Speaker - Prof. M. A. Shah (FRSC, FAPS), Dean, Alumni & International Affairs & Former Head, PG Department of Physics, NIT, Srinagar, J&K, India on the topic "***Nano Science: A Precursor for Modern Technologies***"



M) Any other details – None

(Prof. Rashmi Bhardwaj)
Dean, USBAS