



**INDIAN INSTITUTE
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Legacy that inspires the future

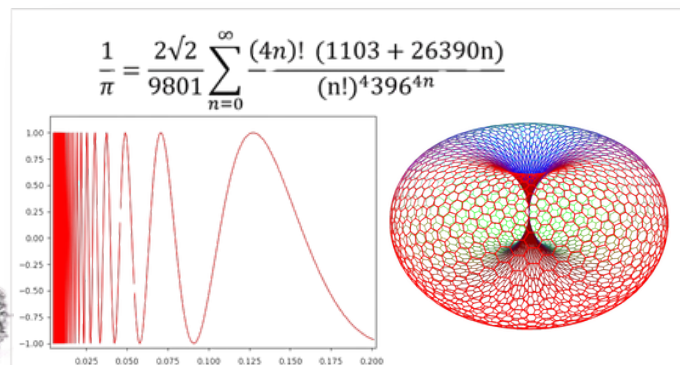
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GANANAM

A Quarterly Newsletter of
Department of Mathematics and Computing





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Message from the Head of Department



I am delighted to present Volume 3, Issue 2 of GANANAM, the quarterly newsletter of the Department of Mathematics & Computing. This issue highlights the Department's recent activities, achievements, and continued commitment to academic excellence.

The Department is continuously striving to strengthen and diversify its academic expertise by welcoming faculty members from a wide range of research areas. In line with this commitment, two new faculty members joined the Department during this period, further enriching its teaching and research environment. The Department warmly welcomes them and looks forward to their valuable contributions in advancing its mission of excellence in academic and research.

In addition, this issue showcases the recent research publications of our faculty members, a newly granted patent, details of sponsored research projects, and guest lectures delivered by them. It also highlights the notable achievements of our Ph.D. scholars and postgraduate students, including the receipt of international travel grants and fellowships in recognition of their academic and research excellence. Furthermore, the newsletter features updates on recent developments, emerging trends, and advancements in mathematics and computing.

Together, we are working to make meaningful contributions across mathematics, computing, and beyond. We aim to strengthen our efforts, work with researchers from different backgrounds, and explore new ideas, research opportunities, and innovations.

I would like to express my heartfelt gratitude to the editorial team for their dedication in producing this newsletter, and I thank all contributors for their insightful and valuable contributions.

Prof. S. P. Tiwari, *Head of the Department*



Welcome Aboard

Prof. Himadri Halder joined the Department as an Assistant Professor in April 2026. He was previously an NBHM Postdoctoral Fellow at IISc Bangalore, and before that, a Visiting Scientist at the Stat-Math Unit, ISI Bangalore. He earlier held a postdoctoral position at IIT Bombay, and completed his PhD from IIT Bhubaneswar in October 2022.



His research interests lie primarily in Complex Analysis and Functional Analysis. More specifically, his work focuses on Geometric Function Theory in one and several complex variables, harmonic and pluriharmonic function theory, and their interactions with local Banach space theory. He is also interested in spectral set theory, operator theory, and multivariate versions of the von Neumann inequality, exploring the interplay among complex analytic methods, geometric structures, and functional-analytic techniques.



Prof. Manpreet Singh joined the Department as an Assistant Professor in May 2026. He earned his M.S. and Ph.D. from the Indian Institute of Science Education and Research (IISER) Mohali in 2021. Following the completion of his doctoral studies, he held postdoctoral positions at the Harish-Chandra Research Institute (HRI) and the Centre for Mathematical Analysis, Geometry, and Dynamical Systems (CMGSD), Instituto Superior Técnico (IST), Portugal, from 2022 to 2023. He subsequently served as a Fulbright-Nehru Postdoctoral Fellow at the University of South Florida, USA, from 2023 to 2025.



Research & Publications

- S. Keshav, A. Das, S. Singh, R. Singh, M. Singh. New Generalised Semi-Analytical Approach for the Multidimensional Nonlinear Collisional Fragmentation Equations, International Journal for Numerical Methods in Fluids, April 2026.
- S. Roy, P. K. Tiwari, G. Kumar, **R.K. Upadhyay**. The Role of Selective Predation in Predator-Prey Systems with Indirectly Transmitted-Disease in Prey. International Journal of Bifurcation and Chaos, 36, 9, 2650112, 1-30, April 2026.
- J. Datta, A. K. Sethy, **R.K. Upadhyay**. Understanding the spatiotemporal dynamics and pattern analysis of population model with Holling type-IV functional response. Pramana – J. of Physics, 100, 69, 1-26, April 2026.
- D. Pradhan, **R.K. Upadhyay**. Unravelling the Spatiotemporal Dynamics of Amyloid- β -Induced Astrocyte-Neuron Network Model in Alzheimer's Disease. Journal of Mathematical Biology, 92, 5, 81, 1-51, April 2026.
- S. A. Sahu and S. Shukla. Closed-form analysis of SH wave propagation in viscous loaded flexomagnetic-piezomagnetic plate with microstructural substrate effects. The European Physical Journal Plus, 141, 354, April 2026.
- J. Jaing, A. Kalita, and M. Gurusamy. DGTS: Dependency-aware GNN-guided Proactive Task Scheduler for Cloud-Edge Systems. IEEE Wireless Communications and Networking Conference (WCNC'2026), April 2026.
- X. Tao, D. Ma, L. Li, **M. Verma**, L. Chen, X. Xie, S. Chen, W. Li, J. Kato, B. Zhang, and X. Hu. LIBS: Instructional Action Quality Assessment via Supervoxel-Based Fine-Grained Attribution. IEEE Transactions on Computers, 75, 5, 1835-1848, May 2026.



Research & Publications

- **A. Kalita.** Talk with the Things: Integrating LLMs into IoT Networks. IFIP Networking 2026 - CoGen-AI-FNC Workshop, May 2026.
 - **A. Jayswal, G. Uniyal.** Wolfe Type Duality for a Semi-Infinite Variational Problem Involving Caputo-Fabrizio Fractional Derivative, Journal of Optimization Theory and Applications, 210, 1, June 2026.
 - **S. Das, S. Laxmi.** Adaptive residual refinement in physics-informed neural networks for breast cancer thermal modeling and data-driven partial differential equation discovery, Engineering Applications of Artificial Intelligence, 173, 114435, June 2026.
 - **Z. Ansari, M. Dewangan, A. Das, S. Heinrich, R. Ramachandran, M. Singh.** Bridging hydrodynamics and granulation kinetics: An efficient 2D CFD-coupled compartmental PBM approach for fluidised bed granulation, Computer Methods in Applied Mechanics and Engineering, 461, 119154, June 2026.
 - **S. Pujari, R. Agrawal, R.K. Upadhyay.** Modeling Predator-Prey Systems with Strong Allee Effect and Mutual Interference among Predators. International Journal of Bifurcation and Chaos, 36, 12, 2650188, 1-30, June 2026.
 - **S. Das and A. K. Singh.** Liouville Green Analysis of Love Wave Dynamics at Spring–Membrane Interfaces in Generalised Linearly Graded Piezo-Viscoelastic Structures with Flexoelectric and Semiconductor Coupling. 29th International Conference on Composite Structures (ICCS29), June 2026.
 - **S. Shukla and S. A. Sahu.** Influence of a Piezomagnetic Coating on SH Waves in a Pre-Stressed and Electrically Biased Piezoelectric Semiconductor Half-Space with Functional Grading. 29th International Conference on Composite Structures (ICCS29), June 2026.
-



Research & Publications

- T. K. Das, T. Ojha, S. Bhosale, S. Karmakar, S. Halder, S. Barik. A Quantum Reinforcement Learning Framework for Sustainable Internet of Vehicles toward Future Electric Mobility. IEEE International Conference on Sustainable Energy and Future Electric Transportation (SEFET), VNIT Nagpur, July 2026.
 - T. P. Raptis and T. Ojha, “Gait-Diverse Avatar Selection for Realistic Synthetic Crowds in the Metaverse”, IEEE Computers, Software, and Applications Conference (COMPSAC 2026), Madrid, Spain, July 2026.
 - A. Gupta, S. Kumawat, M. Verma, T. Ojha, A. Galav. FADER: Frequency ADaptive implicit nEuRal representations, 11th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), July 2026, Jaipur, India.
 - S. Mandal, P. K. Tiwari, R.K. Upadhyay, A.K. Misra. Impacts of cooperative hunting and Allee effect on the stability of a three-species system with sexually reproducing top predators. Mathematical Biosciences, 399, 109749, 1-17, September 2026.
 - R. Pradhan, P. Dattatray, A. Kalita, and M. Gurusamy. Reliability-Energy Tradeoff-aware Dynamic Service Placement in Edge-Enabled IoV Networks. IEEE 104th Vehicular Technology Conference (VTC-Fall'2026), September 2026.
 - J. Jiang, A. Kalita, A. Hazra, and M. Gurusamy. Structural Importance Driven Task Scheduling with Dependencies Using a Hybrid GNN-DRL Approach in Edge-Cloud Systems. IEEE 104th Vehicular Technology Conference (VTC-Fall'2026), September 2026.
 - Afa, A. Kalita, T. Ojha. Traffic Prediction and Load-Aware Adaptive RAW Slot Allocation for IEEE 802.11ah IoT Networks, TENCON 2026 - 2026 IEEE Region 10 Conference, Bali, Indonesia, October 2026.
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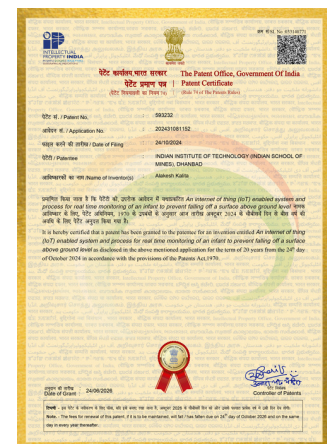
Research & Publications

- A. Francis, **S. Laxmi**. PSViT-PINN: Physics-Structured Vision Transformer PINNs for Tumor Thermal Field Prediction in Biomedical Imaging. SIAM Conference on Imaging Science (IS26), Salt Lake City, Utah, U.S, 2026.
- Md Yeasin, A. Sarkar, **R. K. Upadhyay**, B. Mandal, A. Thakur, H. S. Roy, P. Kumar, and R. K. Paul. Exploring the Impact of Climate Change on Crop Yields: A Deep Dive with Dual Wavelet Enhanced Nonlinear ARDL Modeling. Theoretical and Applied Climatology, 2026.
- **H. K. Mishra**. On generalization of Williamson's theorem to real symmetric matrices, Journal of Symplectic Geometry, 2026.

PATENTS

Patent Highlights

- **Prof. A. Kalita** was granted a patent on "An Internet of Things (IoT) enabled System and Process for real-time Monitoring of an Infant to Prevent Falling Off a Surface above Ground level". [Ref No: 202431081152, date: 24 June 2026]



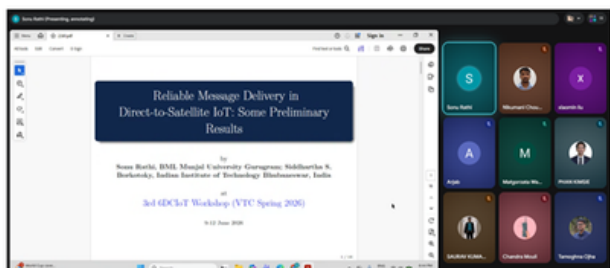
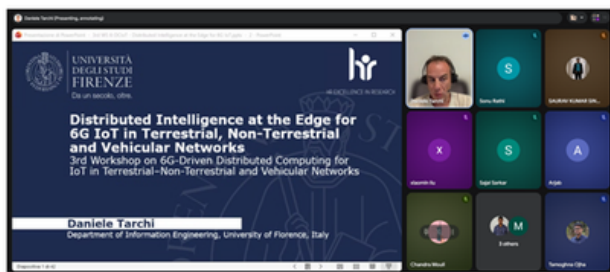
Sponsored Research Projects

- “AI-Driven Multimodal Material Understanding Systems for Accurate and Scalable Waste Segregation in Indian Context”, Anusandhan National Research Foundation (ANRF), PI: Prof. Manisha Verma, INR 42.54 Lakhs, June 2026.

EVENTS

Workshops & Programmes

Prof. T. Ojha organized the 3rd Workshop on “Distributed Computing for 6G IoT Networks in Terrestrial–Non-Terrestrial and Vehicular Networks” at IEEE VTC-Spring 2026 at Nice, France on 9 June 2026. The workshop was held via online mode. The workshop hosted a keynote talk on “Distributed Intelligence at the Edge for 6G IoT in Terrestrial, Non-Terrestrial and Vehicular Networks” by Prof. Daniele Tarchi, University of Florence, Italy and five technical paper presentations.



Student Achievements

CSIR Travel Grant

Mr. Sanchit Das, a PhD scholar under the supervision of Prof. Abhishek K. Singh, was awarded the CSIR International Travel Grant to present his research work at the 29th International Conference on Composite Structures (ICCS29), held at the University of Cagliari, Italy. He presented a paper titled “Liouville Green Analysis of Love Wave Dynamics at Spring–Membrane Interfaces in Generalised Linearly Graded Piezo-Viscoelastic Structures with Flexoelectric and Semiconductor Coupling” at the conference on 23 June 2026.



ANRF Travel Grant



Ms. Shreya Shukla, a PhD scholar under the supervision of Prof. S. A. Sahu, received ANRF International Travel Support to present her work in 29th International Conference on Composite Structures (ICCS29) at University of Cagliari, Italy. She presented the paper titled "Influence of a Piezomagnetic Coating on SH Waves in a Pre-Stressed and Electrically Biased Piezoelectric Semiconductor Half-Space with Functional Grading" at the conference on 26 June 2026.



Student Achievements

Fellowship

MSc (Mathematics and Computing) students, **Mr. Debanshu Jana** (25MS0047) and **Mr. Subhadeep Nandi** (25MS0149), under the supervision of **Prof. T. Ojha**, received the “CIL – IMiN Fellowship 2026” awarded by the IMiN CoE at TEXMiN IIT (ISM) Dhanbad.



Mr. Debanshu Jana



Mr. Subhadeep Nandi

DOCTORAL HIGHLIGHTS

Thesis Defence



Mr. Arvind Kumar Alok (22DR0028), a PhD scholar under the supervision of **Prof. G. N. Singh**, has been awarded his PhD vide notification dated 25 June 2026 on the title: “Some Improved Estimation Procedures of Reliability and Population Parameters in Ranked Set Sampling”.

This thesis develops frequentist and Bayesian reliability methods using MinRSSU, MaxRSS, and MRSS for competing risks, stress–strength reliability, multi-stress strength reliability, and variance estimation under censored or costly sampling. Monte Carlo simulations and real-data analyses show that RSS-based methods generally outperform SRS through lower bias and MSE, improved accuracy, and shorter confidence or credible intervals.

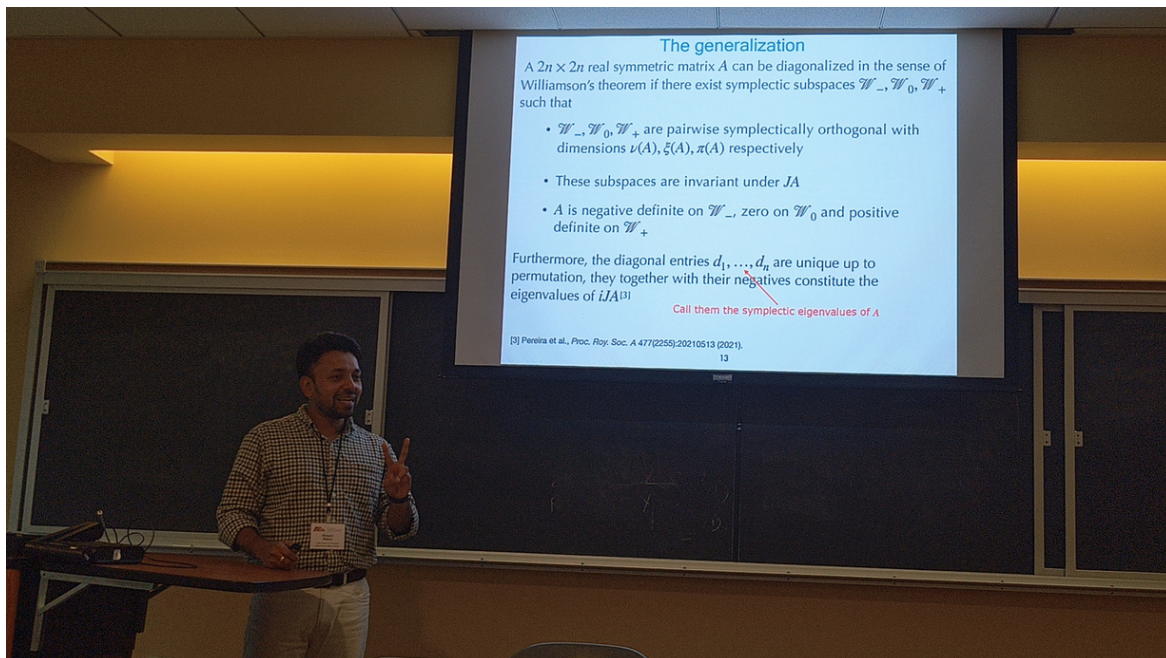


Invited Talks

- **Prof. J. Dasgupta** delivered an invited talk on “Equivariant vector bundles on complexity-one T-varieties”, at the Harish-Chandra Research Institute (HRI) on 12th May 2026.
- **Prof. A. K. Das** delivered the 'Rising Star' lecture at the 10th World Congress on Particle Technology (WCPT10), Japan on 13th May 2026. His talk was on “Scalable Simulation of Aggregation Processes Using Coarse-Grained DEM-PBM Coupling”.
- **Prof. A. Selvan** delivered an invited talk on “From Hilbert Spaces to Wavelets: Multiresolution and Sampling with Stable Generators”, at the Department of Mathematics, IIT Patna on 15 May 2026.
- **Prof. H. K. Mishra** delivered an invited talk titled “On generalization of Williamson’s theorem to real symmetric matrices”, at the ILAS 2026, Virginia Tech, Blacksburg, USA during 18-22 May 2026.
- **Prof. T. Ojha** delivered an expert lecture on “UAV Systems & Applications” at Short Term Course on “Full-Stack IoT Engineering: From IoT Hardware to Cloud Computing and AI” organized by IIT Kharagpur on 24 May 2026.
- **Prof. R. K. Upadhyay** delivered an invited talk on “Unraveling double trouble: Using Mathematical models to Tackle Ecological Challenges and Neurological disorders” at South Asian University, New Delhi on 3 June 2026.
- **Prof. T. Ojha** delivered a keynote lecture on “AI/ML for the Next Evolution in Future IoT Networks” at IEEE VTC-Spring 2026 workshop “LPWAN-Based Terrestrial-Non-Terrestrial Integration for Vehicular Networks: AI-Driven Hardware Platforms, Testbeds, and 6G Directions” on 9 June 2026.

Invited Talks

- **Prof. R. K. Upadhyay** delivered an invited talk on “Unraveling double trouble: Using Mathematical models to Tackle Ecological Challenges and Neurological disorders” at IIT Mandi on 12 June 2026.
- **Prof. T. Ojha** delivered an invited talk on “Edge computing in future networks” at MeitY Sponsored FDP on Edge AI for Smart Sensors & Secure Autonomous System organized by IIIT Gwalior on 13 June 2026.
- **Prof. R. K. Upadhyay** delivered an invited talk on “Unraveling double trouble: Using Mathematical models to Tackle Ecological Challenges and Neurological disorders” at Kashmir University on 18 June 2026.
- **Prof. H. K. Mishra** delivered an invited talk on "Near-optimal performance of square-root measurement for general score functions and quantum ensembles", at the Workshop in Matrices and Operators, organized by Shiv Nadar University, on 26 June 2026.





Mathematics & Computing News

- **New AI body map reveals obesity's hidden attack on facial nerves:** Scientists have created an AI-powered system that can scan and map an entire mouse body in extraordinary detail — and it just uncovered a surprising new effect of obesity. Beyond disrupting metabolism, obesity appears to damage facial sensory nerves linked to touch and sensation, while also triggering widespread inflammation across the body.
 - **New light-powered chip could accelerate AI and quantum computing:** Scientists have created a tiny chip that can generate, steer, and read light-based information all in one device, marking a major leap toward ultra-fast, energy-efficient computing. The breakthrough uses atomically thin materials and nanoscale structures to control a unique quantum property of light called the “valley” degree of freedom, allowing information to be encoded in new ways.
 - **A 150-Year-Old Geometry Rule Just Fell:** Mathematicians have found two different doughnut-shaped surfaces that look identical when measured locally but are actually different overall. For more than 150 years, a principle from French mathematician Pierre Ossian Bonnet held that a surface's metric and mean curvature together determine its exact shape. A team from the Technical University of Munich, the Technical University of Berlin, and North Carolina State University constructed a pair of compact tori sharing the same metric and curvature but different global structure, disproving the rule. The finding closes a decades-old open problem in differential geometry.
 - **2026 declared the "Year of Mathematics" in the US:** The United States is celebrating 2026 as a nationwide Year of Mathematics, an initiative engaging the public with the mathematical sciences through community programs, documentary screenings, and educational events. The celebration coincides with the International Congress of Mathematicians being hosted in Philadelphia this July.
-

Faculty Profiles




Prof. A Antony Selvan

ASST. PROFESSOR

Computational Harmonic Analysis



Prof. Abhay Kumar Singh

Professor

Coding Theory, Post Quantum Cryptography, Quantum Computing



Prof. Abhishek Kumar Singh

Professor

Differential Equations, Integral Equations, Solid Mechanics, Elastodynamics, Wave Propagation and Vibration Aspects, Theoretical Seismology



Prof. Ajit Singh

ASST. PROFESSOR

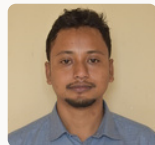
Number Theory and Combinatorics, Partition Theory, q-series and Modular Forms



Prof. Akhilesh Prasad

Professor (HAG)

Integral Transforms, Pseudo-Differential Operators, and Wavelet Analysis



Prof. Alakesh Kalita

ASST. PROFESSOR

Internet of Things (IoT), AI/ML For Computer Systems, Edge/Cloud Computing



Prof. Anurag Jayswal

Professor

Mathematical Programming, Generalized Convexity, Vector Optimization, Variational Inequality, Optimal Control



Prof. Ashok Das

ASST. PROFESSOR

Modeling, simulation, and analysis of particulate processes



Prof. Atul Kumar Verma

ASST. PROFESSOR

Mathematical Modelling & Simulation, Statistical Mechanics



Prof. Badam Singh Kushvah

PROFESSOR

Astrodynamics, Guidance and Control Systems, Space Trajectory Design, GPU Computing/HPC



Prof. Dinabandhu Pradhan

Professor

Graph Theory And Graph Algorithms

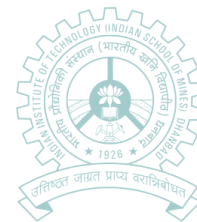


Prof. Gajendra K. Vishwakarma

Assoc. Professor

Survey Sampling Theory and Techniques, Regression Models and Machine Learning, Data Imputation Models, Bayesian Statistics, Joint Modeling and Longitudinal Data Analysis

Faculty Profiles



Prof. Garib Nath Singh

Professor (HAG)

Sample Surveys, Missing Data Analysis, Data Analysis



Prof. Hemant Kumar Mishra

ASST. PROFESSOR

Matrix Analysis, Quantum Information Theory, Linear Algebra, Functional Analysis



Prof. Himadri Halder

ASST. PROFESSOR

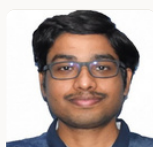
Complex Analysis, Functional Analysis



Prof. Jyoti Dasgupta

ASST. PROFESSOR

Algebraic Geometry



Prof. Kartikay Gupta

ASST. PROFESSOR

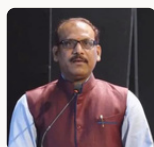
Data Science And Machine Learning



Prof. Manisha Verma

ASST. PROFESSOR

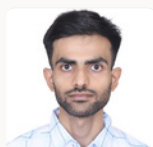
Computer Vision, Deep Learning, AI in Healthcare



Prof. Mritunjay Kumar Singh

Professor (HAG)

Solute Transport Modelling, Groundwater Contamination Problems, Mathematical Modelling & Computation



Prof. Manpreet Singh

ASST. PROFESSOR

Low-dimensional Topology, Combinatorial group theory



Prof. Neeru Bala

ASST. PROFESSOR

Operator theory



Prof. Pramod Kumar Kewat

Assoc. Professor

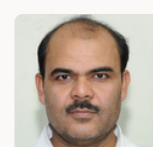
Algebraic Coding Theory and Number Theory



Prof. Ramanababu Kaligatla

Assoc. Professor

Differential And Integral Equations, Wave-Structure Interactions



Prof. Ranjit Kumar Upadhyay

Professor (HAG)

Nonlinear Differential Equations, Chaos Modeling, Mathematical Neuroscience, Nonlinear dynamics, Disease dynamics, Population dynamics, Virus dynamics, Brain dynamics and Neural modeling

Faculty Profiles



Prof. S. P. Tiwari

PROFESSOR

Topology, Category Theory, and Fuzzy Automata Theory



Prof. Sanjeev Anand Sahu

Assoc. Professor

Electro-elastodynamics & Magneto-elastodynamics, Solid Mechanics, Early Earthquake Warning System



Prof. Santimoy Kundu

Assoc. Professor

Theoretical Seismology And Wave Propagation Aspects



Prof. Scindhiya Laxmi

ASST. PROFESSOR

Physics Informed Machine Learning, Support Vector Machines, Scientific Artificial Intelligence



Prof. Shuvashree Mondal

ASST. PROFESSOR

Statistical inference, Robust estimation, Reliability Analysis, Distribution Theory



Prof. Snehajit Misra

ASST. PROFESSOR

Vector bundle theory, algebraic geometry, Seshadri constants, moduli problems of vector bundles and Higgs bundles on projective varieties



Prof. Srinivasa Rao Pentyla

Assoc. Professor

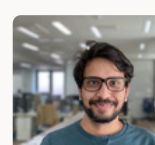
Numerical Methods for PDEs, CFD, AI/ML Procedures for Solution of Real Life Models



Prof. Subhashis Chatterjee

Professor (HAG)

Software Engineering, Algorithms, Bioinformatics



Prof. Sudhakar Kumawat

ASST. PROFESSOR

Computer Vision, Deep Learning



Prof. Tamoghna Ojha

ASST. PROFESSOR

AI/ML For IoT, Edge Computing, Digital Twin, 5G/6G, Future Networks

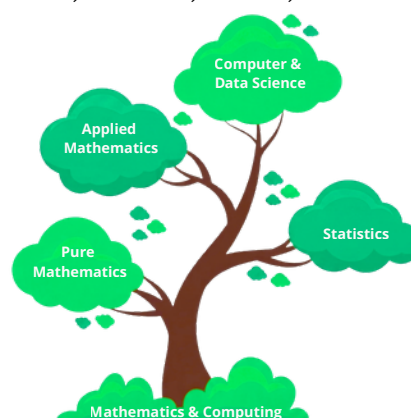


About the Department

The Department of Mathematics and Computing at IIT(ISM) Dhanbad has its roots in the establishment and evolution of the institute itself. Over the decades, the institution has expanded its academic offerings, and our Department is one of the key departments that emerged as part of the institute's broader academic growth.

Presently, the department is home to 34 faculty members, engaged in a wide array of research fields including Applied Mathematics, Pure Mathematics, Statistics, and Computer & Data Science. Our research efforts are supported and recognized by prominent national funding agencies such as CSIR, NBHM, DRDO, ISRO, and DST.

The department offers the programs such as B. Tech (Mathematics & Computing), Integrated M.Tech (Mathematics & Computing), M. Sc (Mathematics & Computing) and M. Tech (Data Analytics). In addition, the department also offers a Ph.D. program in Mathematics and Statistics. Currently, over 100 Ph.D. students are engaged in research at the department.



Editorial Team

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