# ZENITH

## *Department of* Applied Mathematics

# Delhi Technological University

# CONTENTS

*From the Desk of*
# Head of Department

My heartiest congratulations to the Editorial Board of the Department of Applied Mathematics on the successful publication of this year's magazine. This edition exemplifies the collective dedication of our esteemed faculty and ambitious students' effort.

Swami Vivekananda said

"**A good education is a foundation for a better future**".

The Department of Applied Mathematics sincerely believe on this and an honest effort is made to impart the best education. The department plays vital role in providing a strong foundation of mathematics to all the engineering sciences, simultaneously providing a rigorous and comprehensive curriculum that encompasses core mathematics, financial studies, and computer engineering to our students of Mathematics and Computing. These academic offerings are meticulously designed to equip our students with the advanced knowledge and analytical skills required to navigate and excel in an increasingly complex and technology-driven world.

The beginning of the current academic year was marked by the pleasant news of successful NBA accreditation of the B.Tech. programme of Mathematics and Computing for three years, which paved the path for our students to have international recognition.

This year has also been distinguished by remarkable strides in both research and education. The faculty members, research scholars and students' untiring efforts have contributed groundbreaking research in applied and pure areas of Mathematics, and the field of computer science as well.

I am happy to share that one of our outgoing UG student Mr. Aneesh Panchal has been selected for Ph.D. programme in IISC Bangaluru. Congratulations and best wishes to Mr. Aneesh Panchal for his achievement and future endeavors.

The bench mark of the senior has further been raised by our motivated and devoted family member of the department, Mr. Rahul Gupta of third year, who won the iDEX challenge on BRO problem statement, and earned a project grant of Rs.1.5 Cr.

The department leaves no stone unturned for holistic development of students and it gives me immense pleasure to inform that a week of "Joy of giving" was organized by the department with active participation of students.

The expectation runs high from a good citizen, better student and best human being, and I shall leave you all with the saying of Swami Vivekananda,

> **"The best thermometer to the progress of a nation is its treatment of its women".**

**Prof. Ramesh Srivastava**
Head of Department
Department of Applied Mathematics

# ACHIEVEMENTS/HIGHLIGHTS OF THE DEPARTMENT

The Department is renowned for its eminent faculty and motivated students. Our faculty members are highly qualified and experienced in their respective fields, while our students are passionate about learning and exploring new avenues of knowledge. As part of their academic activities, our faculty members and students are constantly engaging in various activities that go beyond the regular curriculum. These activities include research projects, internships, workshops, seminars, conferences, competitions and other initiatives that help them gain valuable skills as well as broaden their understanding of the subject matter. Achievements of the faculty members and students for the academic year 2023-24 are mentioned below:

## DETAILS OF COMMENDABLE RESEARCH AWARDS

| Authors | Paper Title | Journal Reference |
|---|---|---|
| **Neha Punetha and Goonjan Jain** | Optimizing Sentiment Analysis: A Cognitive Approach with Negation Handling via Mathematical Modelling | Cognitive Computation 16, 624 (2023). Publisher- Springer Impact Factor- 4.3 |
| **Neha Punetha and Goonjan Jain** | Unsupervised sentiment analysis of Hindi reviews using MCDM and game model optimization techniques | Sādhanā 48, 195 (2023) Publisher- Springer Impact Factor- 1.4 |
| **Anuma Garg and Satyabrata Adhikari** | Detection of the genuine non-locality of any three-qubit state | Annals of Physics 455, 169400 (2023). Publisher-Elsevier Impact Factor-3.0 |
| **Himanshu Chaudhary, Aditya Kaushik and Ankita Kohli** | Cosmological test of $\Sigma/\Theta$ a as a function of scale factor in f(R,T) framework | New Astronomy 103, 102044 (2023). Publisher-Elsevier Impact Factor-1.9 |

| | | |
|---|---|---|
| **Nitika Sharma and Aditya Kaushik** | A uniformly convergent difference method for singularly perturbed parabolic partial differential equations with large delay and integral boundary conditions | Journal of Applied Mathematics and Computing 69, 1071 (2023). Publisher-Springer Impact Factor- 2.4 |
| **Abhishek Kumar, Kanica Goel and Nilam** | Dynamics of a nonlinear epidemic transmission model incorporating a class of hospitalized individuals: a qualitative analysis and simulation | Journal of Physics A: Mathematical and Theoretical 56, 415601 (2023). Publisher- IOP Science Impact Factor- 2.0 |
| **Dhirendra Kumar and Himanshi Lohit** | Modified total Bregman divergence driven picture fuzzy clustering with local information for brain MRI image segmentation | Applied Soft Computing 144, 110460 (2023). Publisher-Elsevier Impact Factor- 7.2 |
| **Inder Khatri, Dhirendra Kumar and Aaryan Gupta** | A noise robust kernel fuzzy clustering based on picture fuzzy sets and KL divergence measure for MRI image segmentation | Applied Intelligence 53, 16487 (2023). Publisher-Springer Impact Factor- 3.4 |
| **Tanya Malhotra and Anjana Gupta** | Probabilistic multiplicative unbalanced linguistic term set and its application in matrix games | International Journal of Machine Learning and Cybernetics 14, 1253 (2023). Publisher-Springer Impact Factor- 3.1 |
| **Vinita Khatri and C.P.Singh** | Brans–Dicke cosmology with cosmological term | Physics of the Dark Universe 42, 101300 (2023). Publisher- Elsevier Impact Factor- 5.0 |
| **Monika Choudhary and Aditya Kaushik** | A uniformly convergent defect correction method for parabolic singular perturbation problems with a large delay | Journal of Applied Mathematics and Computing 69, 1377 (2023). Publisher-Springer Impact Factor- 2.4 |
| **Monika Choudhary, Aditya Kaushik and Manju Sharma** | A Parameter-Robust Numerical Method Based on Defect-Correction Technique for Parabolic Singular Perturbation Problems with Discontinuous Convection Coefficient and Source | International Journal of Computational Methods 20, 2350017 (2023). Publisher- World Scientific Impact Factor- 1.4 |

# INVITED TALKS/PAPER PRESENTATIONS

The Department is committed to providing its faculty members and students with the opportunity to connect with other Institutes and Universities around the world. Through regular visits, faculty members and students are able to deliver invited talks and present papers at prestigious events.

These visits provide invaluable opportunities for the Department's faculty members and students to learn from their peers, exchange ideas, discuss current trends in their field, and network with potential employers. By engaging in these activities, they are able to gain a better understanding of the research being done in other institutions while providing a platform for them to showcase their own work. The details for the academic year 2023-2024 are given below:

## INVITED TALKS

- **Dr. Anshul Arora** delivered an invited talk on "H-PINTDroid: Hybrid Android Malware Detection Using Permissions, Intents and Network Traffic" in The 15th International IEEE Conference on Computing, Communication and Networking Technologies (ICCCNT) during June 24-28,2024 organised by IIT Mandi.

- **Prof. S Sivaprasad Kumar** delivered an invited talk on "A lecture series of Mathematics for Social Sciences" on April 25, 2024 organised by Dept. Mathematics, Indraprastha college for women.

- **Dr. Satyabrata Adhikari** delivered an invited talk on "Structural Physical Approximation of Realignment Operation" at the National Workshop on Quantum Technologies (NWQT-2024) on March 01-02, 2024, organized by Banaras Hindu University.

- **Dr. Nilam** delivered an invited talk on "Mathematical Modelling and Simulation" in 5 days National workshop on Mathematical Modelling and Simulation during February 13-17, 2024 organised by Sri Guru Nanak Dev Khalsa College, University of Delhi.

- **Dr. Dhirendra Kumar** delivered an invited talk on "Mathematics in Image Processing" on February 16, 2024, organised by DST Centre for Interdisciplinary Mathematical Sciences (CIMS), Institute of Science, Banaras Hindu University, Varanasi.

- **Dr. Nilam** delivered an invited talk on "Recent advancement of Mathematics" in 3-day National Seminar on Recent Advancement of Mathematics on January 22-24, 2024, organized by the Department of Mathematics, Pondicherry University.

- **Dr. Dhirendra Kumar** delivered an invited talk on "Python for image processing" on September 22, 2023, organized by DST Centre for Interdisciplinary Mathematical Sciences (CIMS), Institute of Science, Banaras Hindu University, Varanasi.

# PUBLICATIONS

Apart from the research publications which have been awarded by DTU for their excellence in publication category, faculty members and research scholars have published their research work in reputed journals/conferences. Details of the current academic year i.e., AY-2023-24 are given below:

- **Neha and S. Sivaprasad Kumar**, A Conjecture on H3(1) for Certain Starlike Functions, Mathematica Slovaca 73, 1197 (2023); I.F.-0.9, SCIE.

- **Neha and S. Sivaprasad Kumar**, Differential subordination of certain class of starlike functions, Accepted in Complex Variables and Elliptic Equations (2024); I.F.-0.9, SCIE.

- **Yash Sharma and Anshul Arora**, IPAnalyzer: A novel Android malware detection system using ranked Intents and Permissions, Accepted in Multimedia Tools and Applications (2024); I.F.-3.0, SCIE.

- **Yash Sharma and Anshul Arora**, A comprehensive review on permissions-based Android malware detection, International Journal of Information Security 23, 1877 (2024); I.F.- 2.4, SCIE.

- **Monu and L.N.Das**, Formulation and evaluation of the radius of maximum wind of the tropical cyclones over the North Indian Ocean basin, Theoretical and Applied Climatology 155, 4521 (2024); I.F.-2.8, SCIE.

- **Monu and L.N.Das**, Analyze the SATCON algorithm's capability to estimate tropical storm intensity across the West Pacific basin, Journal of Earth system sciences 133, 79 (2024); I.F.-1.3, SCIE.

- **Vinita Khatri and C.P. Singh**, Brans-Dicke cosmology with cosmological term, Physics of the Dark Universe 42, 101300 (2023); I.F.- 5.0, SCIE.

- **C.P. Singh and Vinita Khatri**, Viscous fluid dynamics with decaying vacuum energy density, Physical Review D 109, 023508 (2024); I.F.-4.6, SCIE.

- **Vineet Kumar, Anjana Gupta, and H.C. Taneja**, Interval valued picture fuzzy matrix: basic properties and application, Accepted in Soft Computing 1, 22 (2023); I.F-3.1, SCIE.

- **Vineet Kumar, Anjana Gupta, and H.C. Taneja**, A novel similarity measure and score function of Pythagorean fuzzy sets and their application in assignment problem, Economic Computation and Economic Cybernetics Studies and Research 57, 313 (2023); I.F.-0.9, SCIE.

- **Vineet Kumar, Anjana Gupta, and H.C. Taneja**, Interval-valued spherical fuzzy matrix and its applications in multi-attribute decision-making process, Maejo International Journal of Science and Technology 17, 3, (2023); I.F.-0.9, SCIE.

- **Abhay Srivastava and Nilam**, Optimal control of a fractional order SEIQR epidemic model with non-monotonic incidence and quarantine class, Computers in Biology and Medicine 178, 108682, (2024); I.F.-7.0, SCIE.

- **Swati and Nilam**, Fractional order model using Caputo fractional derivative to analyse the effects of social media on mental health during Covid-19, Alexandria Engineering Journal 92, 336, (2024); I.F.-6.2, SCIE.

- **Abhishek Kumar, Kanica Goel and Nilam**, Mathematical modeling of terrorism dynamics: Qualitative analysis and theoretical perspective, Accepted in Mathematical Methods in the Applied Sciences, (2023); I.F.- 2.9, SCIE.

- **Abhishek Kumar, Kanica Goel and Nilam**, Dynamics of a Nonlinear Epidemic Transmission Model Incorporating a Class

- of Hospitalized Individuals: A Qualitative Analysis and Simulation, Journal of Physics A: Mathematical and theoretical 56, 41, (2023); I.F.-2, SCIE.

- **Surya Giri and S. Sivaprasad Kumar**, Toeplitz Determinants for a Class of Holomorphic Mappings in Higher Dimensions, Complex Analysis and Operator Theory 17, 6 (2023); I.F.-0.8, SCIE.

- **Surya Giri and S. Sivaprasad Kumar,** Toeplitz determinants for a subclass of quasi convex mappings in higher dimensions, The Journal of Analysis 32, 2099 (2023); I.F.-0.8, ESCI.

- **Shruti Aggarwal, Satyabrata Adhikari and A. S. Majumdar,** Entanglement detection in arbitrary-dimensional bipartite quantum systems through partial realigned moments, Physical Review A 109, 012404 (2024); I.F.-2.6, SCI.

- **Shruti Aggarwal and Satyabrata Adhikari,** Theoretical proposal for the experimental realization of realignment operation, Quantum Information Processing 23, 223 (2024); I.F.-2.5, SCI.

- **Sudhakar Yadav and Vivek Kumar,** Study of Prey -Predator System with Additional Food and Effective Pest Control Techniques in Agriculture, Iranian Journal of Science 48, 193 (2024); I.F.-1.8, SCIE.

- **Neha and Naokant Deo**, An approach to preserve functions with exponential growth by using modified Lupac-Kantrovich operators, Accepted in Numerical Functional Analysis and Optimization 1510 (2023); I.F.-1.41, SCIE.

- **Neha and Naokant Deo**, Generalization of parametric Baskakov operators based on the I-P-E distribution, Accepted in Filomat, (2023); I.F.-0.988, SCIE.

- **Mahima Tomar and Naokant Deo,** Theoretical validation and comparative analysis of higher order modified Bernstein operators, Iranian Journal of Science 48, 1313 (2024); I.F.-1.7, SCIE.

- **Chandra Prakash, D. K. Verma and Naokant Deo**, Approximation by Durrmeyer variant of Cheney-Sharma Cholodovsky Operators, Mathematical Foundations of Computing 6, 535 (2023); I.F.-1.3, ESCI.

- **Naokant Deo, Chandra Prakash and D. K. Verma**, Approximation by Apostol-Genocchi summation-integral type operators, Miskolc Mathematical Notes, 24, 369 (2023); I.F.-1.085, SCIE.

- **Kanita and Naokant Deo**, Parametric Bernstein operators based on contagion distribution, Accepted in Mathematical Methods in the Applied Sciences (2024); I.F.-3.007, SCIE.

- **Sandeep Kumar and Naokant Deo**, Convergence analysis of semi-exponential Post-Widder operators, Accepted in Miskolc Mathematical Notes, (2024); I.F.-0.085, SCIE.

- **Neha and Naokant Deo**, Integral modification of Beta-Apostol-Genocchi operators, Mathematical Foundations of Computing 6, 474 (2023); I.F.-1.3, ESCI.

- **Naokant Deo and Km. Lipi,** Approximation by means of modified Bernstein operators with shifted knots, The Journal of Analysis 32, 1199 (2024); I.F.-0.8, ESCI.

- **Nav Shakti Mishra and Naokant Deo**, Approximation by a composition of Apostol Genocchi and Paltanea-Durrmeyer operator, Kragujevac Journal of Mathematics 48, 629 (2024); I.F.-0.77, ESCI.

- **Yogesh Bharadwaj and C.P. Singh**, Matter creation cosmology with generalized Chaplygin gas, Astrophysics and Space Science 362, (2024); I.F.-1.8, SCIE.

# EVENTS ORGANIZED BY THE DEPARTMENT

| Description of the Event | In collaboration with | Date | Department Coordinator/ co-coordinator of the Event |
|---|---|---|---|
| Poster Presentation Competition | Organized by the Department of Applied Mathematics | 28th February, 2024 | Dr. Dhirendra Kumar |
| EVOLUTE 24 | Organized by DTU Tech Society | 27th-28th February, 2024 | Dr. Vivek Kumar Aggarwal |
| One–week training programme on Maple, SPSS, and Statcraft | Organized by the Department of Applied Mathematics | 12th-16th February, 2024 | Dr. Dinesh Udar Dr. Satyabrata Adhikari |
| Capturing Empathy For Deprived members in the measurement of Deprivation: theory and application in India by Dr. Debarata Pal | Organized by the Department of Applied Mathematics | 8th February, 2024 | Dr. Satyabrata Adhikari |
| Joy of Giving | Organized by students of the Department of Applied Mathematics | 5th-9th February, 2024 | Dr. Dhirendra Kumar |
| Quantum Technology: Possibilities and Concern by Prof. Anirban Pathak | Organized by the Department of Applied Mathematics | 25th January, 2024 | Dr. Satyabrata Adhikari |
| Hybrid Strategy in the Quantum Era by Dr. Vikas Chauhan | Organized by the Department of Applied Mathematics | 15th January, 2024 | Dr. Anshul Arora |
| On some recent developments and trends in ring theory by Dr. Pramod Kanwar | Organized by the Department of Applied Mathematics | 8th January, 2024 | Dr. Dinesh Udar |
| Mathematics Day Celebration | Organized by the Department of Applied Mathematics | 18th-20th December, 2023 | Dr. Dhirendra Kumar |
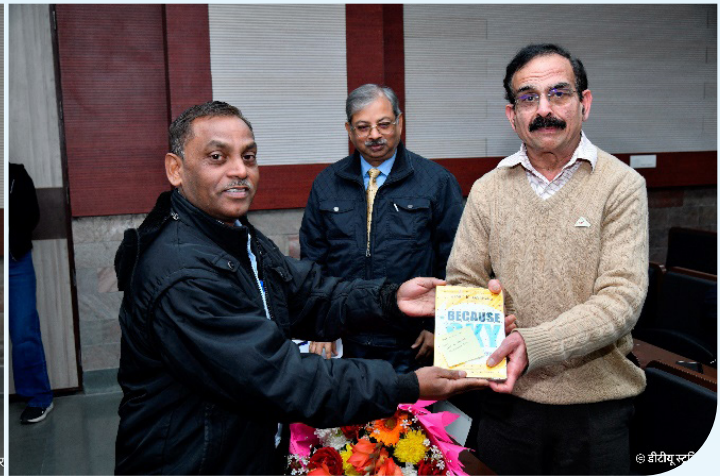
## ACADEMIC ACHIEVERS OF THE DEPARTMENT

| Rank | Roll No. | Name | CGPA |
|---|---|---|---|
| 1. | 2K22/MC/149 | Shivam Sachdeva | 9.53 |
| 2. | 2K22/MC/08 | Affan Arif | 9.472 |
| 3. | 2K22/MC/111 | Prakhar Dhyani | 9.438 |

## EXAMS QUALIFIED BY M.Sc. 2023-2024 BATCH

1. **Sunidhi Singh Rajput**

   - Secured AIR 4696 in GATE 2024 in Data Science and Artificial Intelligence.

   - Secured AIR 15185 in GATE 2024 in Computer Science and Information Technology.

2. **Ritika Gupta**

   - Secured AIR 3397 in GATE 2024 in Data Science and Artificial Intelligence.

## ACHIEVEMENTS BY SUDENT OF 2023-24 BATCH

1. **Sumit Dhull, 2K21/MSCMAT/46**
   - Founder of The Raydee Café, DTU.

2. **Aneesh Panchal, 2K20/MC/21**
   - Pursuing PhD in Computational Data Science, Dept. of CDS, IISc, India.

# PUBLICATIONS/CONFERENCES ATTENDED BY M.Sc. 2023-24 BATCH

1. **Snehal** presented a paper on 'Estimates of logarithmic coefficient of second Hankel Determinant for $S^*(\rho)$', Kongunadu College of Engineering and Technology (Autonomous), Trichy.

2. **Ishika Gupta and Himanshi** presented a paper on 'Efficiency-Based Housing Allocation: Leveraging DEA with CCR Model for Enhanced Decision-Making in Real Estate', Amity University, Noida.

3. **Diya Malhotra and Aarushi Saini** presented a paper on 'Predicting Cardiovascular Disease with Machine Learning: A Comparative Analysis of Classification Models', Amity University, Noida.

## EXTRA-CURRICULAR ACTIVITY

**Kirti Beniwal won medals in Prakram 2024 in Women category**

1. Long Jump (Gold)
2. Race 200m (Gold)
3. Table Tennis-D (Gold)
4. Relay Race 400m (Silver)
5. Football (Silver)



## EXTRA-CURRICULAR ACTIVITIES OF THE DEPARTMENT

By keeping the all-round development of the student in mind, the Department is offering two technical societies, namely, Mathematics and Computing Society (MACS) and Society of Industrial and Applied Mathematics (SIAM). These two societies are continuously conducting events for the benefit of the students.

The SIAM (Society for Industrial and Applied Mathematics) chapter at Delhi Technological University is an exceptional platform for students to delve into the dynamic intersection of technology and mathematics. Through various initiatives, workshops, and events, SIAM DTU has fostered a collaborative environment, throughout 2023-24 where students explored cutting-edge applications of mathematical concepts in technology, developed critical problem-solving skills, and engaged with peers and professionals who share a passion for innovation. Some such thrilling events were:

# PLACEMENTS

Over the past year, the Department of Applied Mathematics of Delhi Technological University has achieved great success in placing its graduates in leading companies and organizations across diverse industries, with a maximum CTC of 33.5 lakhs. The average CTC for our students was 12.21 lakhs, which is a testament to the exceptional education and training they receive at our institution. The median CTC, at 10.5 lakhs, is a good indicator of the strong performance of the majority of our graduates. Our students have secured placements in top-tier companies such as Microsoft, Amazon, Capgemini, American Express, Paytm, as well as a range of other highly respected organizations.

We believe that our students' success is a result of the collaborative approach we take to their education, where we encourage them to be proactive and take ownership of their learning. In addition to a rigorous academic program, we provide ample support to our students through career counselling, mock interviews, and networking opportunities. We also offer a range of extracurricular activities that allow students to develop their soft skills and gain hands-on experience, which is highly valued by employers.

We're proud of the achievements of our students, who have secured placements in various industries, including technology, finance, consulting, and more. Many of them have also received accolades and leadership positions in their respective companies. We're committed to continuing to provide our students with a well-rounded education that prepares them for success in their careers and in life. Our goal is to nurture future leaders who will make a positive impact on the world, and we're confident that our graduates will go on to do great things. Maximum CTC for the current year was 33.5 lakh and average CTC was 12.21 lakh per annum.

## PLACEMENT DATA

| | | |
|---|---|---|
| Total Students Placed | : | 98 |
| Average Base | : | 11.7 LPA |
| Average CTC | : | 17.94 LPA |
| Median Base | : | 11.48 LPA |
| Median CTC | : | 14.1 LPA |
| Highest CTC | : | 51.03 LPA |

## TECHNICAL PLACEMENTS

**Microsoft, CTC: 51.03 LPA**

1. Siddharth Kalkal
2. Riya Nayak (received an offer from Google as well)
3. Palak Chaturvedi
4. Naman Sharma (received an offer from Wells Fargo as well)
5. Dheeraj Kumar

**Salesforce, CTC: 43.8 LPA**

1. Aditya
2. Nikhil Gupta (received an offer from Deutsche Bank as well)

**Google, CTC: 35.24 LPA**

1. Kanishka Thakran (received offers from Wells Fargo and Google as well)

**Atlassian, CTC: 34.8 LPA**

1. Shobhit Bansal

**Flipkart, CTC: 32.75 LPA**

1. Jatin Bansal

## NON-TECHNICAL PLACEMENTS

**Blackrock, CTC: 22.02 LPA**

1. Aryan Tanwar
2. Ujjwal Tyagi

**Amazon, CTC: 18.41 LPA**

1. Mohd. Sahil Ansari

**Axxela, CTC: 14.1 LPA**

1. Aryan Chaudhary

**Associates, CTC: 13.66 LPA**

1. Parn Pratap Singh

# INTERNSHIPS

1. **Sanyam Sethi, 2K22/MC/144**
   - Research Intern at McGill University.
   - Stipend: $4000

2. **Ayush Anand, 2K21/MC/37**
   - Full Stack Web Developer at Purr Data.
   - Stipend: $1500

3. **Divyam Raheja, 2K21/MC/57**
   - SDE Intern at Amazon in International Expansion & Tech.
   - Stipend: Rs. 1,10,000 + $400

4. **Nissan Kumar, 2K22/MC/119**
   - SDE Intern at Amazon.
   - Stipend: Rs. 1,10,000

5. **Yash Verma, 2K21/MC/187**
   - SDE Intern at Amazon.
   - Stipend: Rs. 1,10,00

6. **Divyam Goel, 2K21/MC/56**
   - SWE Intern at Goldman Sachs.
   - Stipend: Rs. 1,00,000

7. **Areeb Ahmed Khan, 2K21/MC/28**
   - Intern Analyst at Wells Fargo International Solutions Pvt. Ltd.
   - Stipend: Rs. 90,000

8. **Bilal Khan, 2K21/MC/42**
   - Technology Intern at Deutsche Bank.
   - Stipend: Rs. 75,000.

9. **Ayush Malik, 2K21/MC/39**
   - Trading Analyst at Axxela.
   - Stipend: Rs. 45,000

10. **Arav Jain, 2K22/MC/26**
    - AI Research Intern at SPARK, IIT Roorkee
    - Stipend: Rs. 2500/week.

11. **Divyansh Raj, 2K23/MC/195**
    - Research Analyst at Solid State Physics Laboratory (SSPL), DRDO.
    - Member of the Acoustic Emission under the Sensor Department.

12. **Yash Chaturvedi, 2K22/MC/183**
    - Research Intern at Institute of System Studies and Analyses (ISSA), DRDO.
    - Member of the Land Wargaming Systems Department.

13. **Abdul Rehman Ansari, 2K21/MC/03**
    - Front End Developer at Intment Technologies.

14. **Shivam Garg, 2K22/MC/147**
    - Quantitative Research Consultant at WorldQuant.
    - AIR 329 and Global Rank 669 at International Quant Championship.

15. **Anjali, 2K23/MSCMAT/72**
    - Research Intern at IIT-BHU

16. **Anchal Jaiswal, 2K22/MSCMAT/06**
    - **Research Intern at IIT-BHU.**
    - Worked on the Heat Equation and Laplace Equation.

17. **Garvit Rastogi, 2K21/MC/59**
    - SDE Intern at ION Trading.
    - Worked with frameworks like Docker, Prometheus and Grafana.

# INVICTUS: WHERE MATH MEETS TECH

Invictus, held from February 10th to 12th, 2024, was a vibrant celebration of the intersection between mathematics and technology. With over 1,000 attendees, this event brought together students, professionals, and enthusiasts, transforming the campus into a lively hub where the synergy of these two disciplines sparked excitement and innovation. Throughout this Techfest, SIAM conducted several engaging events:

1. **Financial Cricket:** Where Numbers Swing Like Bats: On February 11, 2024, a unique fusion of cricket knowledge, strategy, and financial acumen captivated participants and allowed them to showcase their analytical prowess. This event, called Financial Cricket, attracted a staggering 610 students, forming 64 teams, who stepped up to the crease. The objective was clear: to blend the excitement of cricket with financial theory and practice.



2. **Mock Stocks:** Virtual Wall Street: This unique and exhilarating competition combined financial acumen with the thrill of stock trading, creating an engaging experience for participants. In addition to the intrinsic thrill of trading, top-performing teams received prizes and recognition. This acknowledgment motivated participants to perform at their best, reinforcing the educational and competitive aspects of the event.

3. **Jenga Snag:** A Numerical Balancing Act: The Jenga Snag event, hosted during the annual technical festival Invictus'24 at Delhi Technological University (DTU), proved to be an exhilarating experience for participants. Blending strategy, mathematics, and teamwork, this competition challenged teams to skilfully remove wooden blocks from a Jenga tower while maintaining the delicate equilibrium of equations. The triumphant team walked away with a prize pool worth Rs. 10,000 — a fitting reward for their mathematical prowess and strategic finesse.

4. **Desmos Dali:** Graphical Art on Desmos: We hosted the intellectually stimulating event known as "Desmos Dali'' during our annual technical festival, Invictus'24. This competition seamlessly blended mathematics, creativity, and technology, challenging participants to harness their knowledge of mathematical functions and graphical transformations. A total of 73 individual participants engaged in a series of three rounds, each designed to test their Desmos skills and artistic air. The event was a celebration of the intersection between mathematics and visual creativity.

5. **Anime Decoder:** Fun with Anime Cryptography: On February 11, 2024, we hosted the enthralling event known as "Anime Decoder" during the annual technical festival, Invictus'24. This captivating competition immersed participants in the enchanting world of anime, combining cryptic riddles, mind-bending puzzles, and quizzes about iconic scenes. A total of 235 participants formed 64 teams, each equipped with a passion for anime and a determination to decode the secrets hidden within the questions. The event unfolded in three riveting rounds, testing participants' cryptography decryption skills and their knowledge of anime.

# EVOLUTE: WHERE MINDS UNRAVELLED

Conducted on 27th-28th February, 2024, Evolute, with over 250 participants, was amongst the most attractive events conducted by the Dept. of Mathematics. This event, though smaller, celebrated applied mathematics within our department. It was a secret garden where equations bloomed, and ideas sprouted.

1. **Speed Cubing:** Hone your Cube Solving Speed: The hallowed halls of Delhi Technological University (DTU) reverberated with the rhythmic twists and turns of Rubik's cubes during the exhilarating event known as "Speed Cubing." The event featured four thrilling categories: Pyraminx, 2x2, 3x3, and 4x4 cubes. Participants, fuelled by their passion for solving these iconic puzzles, engaged in lightning-fast solves. The atmosphere crackled with anticipation as competitors vied for supremacy in the ultimate speed cubing showdown.
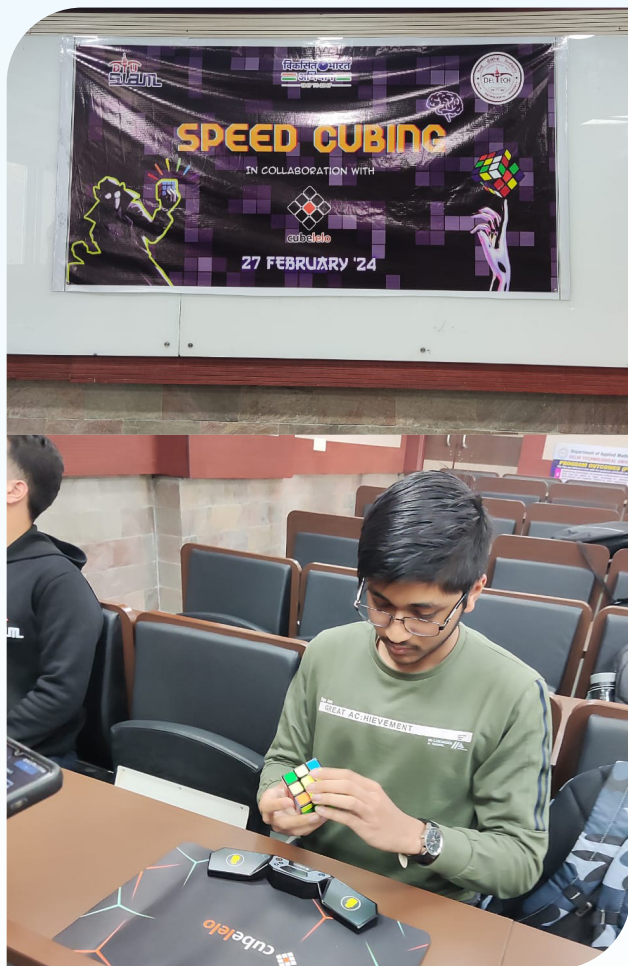


2. **Guesstimate:** Competition of strategic thinking: On February 27, 2024, this competition brought together budding entrepreneurs and financial thinkers from across the campus. The essence of Guesstimate lies in its challenge: participants must apply their business acumen and analytical skills to solve real-world problems. The scenarios span diverse domains—FMCG, Sales, Marketing, and Finance. Armed with limited time, contestants make educated guesses, providing reasoning and assumptions along the way.



3. **Essay Writing:** Better Articulation: At this event, we explored the profound connection between mathematics and human expression through thought-provoking essays. The event highlighted the importance of precise articulation, rigorous research, and critical analysis in understanding complex mathematical concepts like chaos theory, fractals, and Gödel's theorems. By examining the historical and cultural significance of mathematics and confronting ethical dilemmas related to algorithms, our essays transcended disciplines, inviting readers to reflect on the broader impact of mathematical exploration.

4. **Symposium:** A Nexus of Intellectual Discourse and Innovation: The Evolute' 24's Symposium was a vibrant convergence of intellectual discourse and innovation, where senior faculty members delivered insightful talks on cutting-edge topics like quantum computing, neural networks, and bioinformatics. Between sessions, attendees engaged

in stimulating conversations over coffee, forging connections that transcended disciplines. The symposium wasn't just about knowledge transfer but also a celebration of genius and sparking new ideas.

5. **Solitrev:** Paper Presentation and Review Event: Solitrev, a highlight of Evolute' 24, was an intellectual symphony where academia and innovation merged in a celebration of mathematical prowess and scholarly discourse. Participants presented papers on topics ranging from algorithms to mathematical physics, with the event's commitment to scholarly rigor evident through the inclusion of SCI-indexed journals. Interactive review sessions fostered lively exchanges, with scholars dissecting each other's work to refine ideas and expand knowledge. The event's ethos of inquiry encouraged cross-disciplinary conversations, turning coffee breaks into impromptu seminars.



# THE SIAM ORIENTATION

On September 12, 2023, SIAM welcomed over 200 freshers in an event organized by the newly appointed Senior and Junior Council, reflecting a collective effort from all the society verticals. The event kicked off with a campus-wide quiz that energized the new students, followed by an engaging introduction to our mission, highlighting the future applications of Mathematics and Computing in fields like Quantitative Finance, Data Science, and Software Development.

The orientation also provided an overview of SIAM's various wings, such as Corporate, PR, Content, Design, Technical, Media, and SIG, and featured interactive quizzes that tested students' corporate knowledge and problem-solving skills. The impressive internships and placements secured by SIAM's seniors and alumni were showcased, inspiring attendees to strive for excellence. The event concluded with prize distribution, refreshments, and a sense of pride and excitement among the students.

**SIG:** SIAM hosts Special Interest Group (SIG) for 1st and 2nd year Mathematics and Computing students playing a pivotal role in academic support and development. This SIG offers dedicated long study sessions where students can access valuable resources, clarify doubts, and receive guidance tailored to their curriculum. By fostering a collaborative learning environment, the SIG not only enhances understanding of complex topics but also builds confidence among students as they prepare for their semester exams. The interactive sessions and resource-sharing approach significantly improve academic performance and create a supportive community for tackling challenges together.

The Department is constantly encouraging its students to broaden their horizons and trying to bring their artistic capabilities to light. Some of the contributions from the Department are given below:

## Article by Prof. C P Singh

### KNOW ABOUT THE GREAT MATHEMATICIAN AND ASTRONOMER: ERATOSTHENES

**Eratosthenes** was a Greek Mathematician and Astronomer who is famous for his work on prime number and for measuring the diameter of the Earth. He was born in the town of Cyrene in about 276 BC and died in about 194 BC. He lived in Alexandria, a part of Greece.
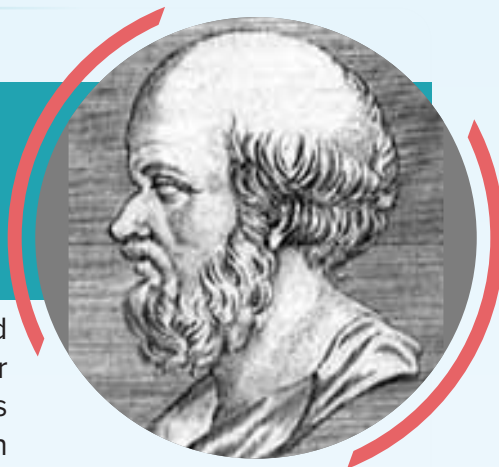
### Imaginary Interview with Eratosthenes:

--Mr. Eratosthenes, you say that the Earth has 24,615 miles of diameter. Could you tell us how you calculated it?

--I learned that at midday, on the longest day of the year, i.e., on 21th June, walls in the city of Syene cast no shadows, because the Sun was directly overhead. However, the same day at the same hour, in the city of Alexandria, the objects do have shadow.

### --So what?

-- It occurred to me to measure the angle that those shadows form and I sent a regiment of soldiers to measure the steps that there were between both cities.

### --Good, and to what does all this come?

-- With that data and my knowledge of trigonometry I started to calculate the size of the Earth and this result came out.

I found that the angle of shadow was one-fiftieth of a whole circle. This meant that the distance from Syene to Alexandria was one-fiftieth of the distance all the way around the planet Earth. I found the distance from Alexandria to Syene was 5000 stades. I multiplied 50 x 5000 to get a answer of 250,000 stades for Earth's circumference. I then added a correction of 2000 stades and concluded that

"Earth circumference is equal to 252,000 stades."

It is to be noted that our current value of Earth's polar circumference is 40,075.16 Km or 24,901.55 miles.

It is both fascinating and awe-inspiring that over 2000 years ago, the ancient Greeks realized that Mathematics could be used to calculate the size of the planets.



Eratosthenes invented the armillary sphere, for 1800 years the most important instrument in astronomy for determining the position of the celestial bodies. He was the first person to explain why the River Nile flooded every year. He invented a reliable logical method to discover prime numbers. He also produced the first map of the world featuring meridian lines and parallel lines.
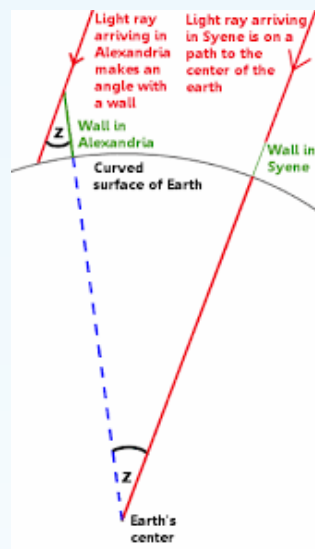
**Prof. C.P. Singh**
Associate Head
Department of Applied Mathematics, DTU

## Input by Anchal Jaiswal

### Interesting Facts about Mathematics

1. The alphabet letter B appears first time in 1Billion.

2. The alphabet letter A appears first time in 1Thousand.

3. FOUR is the only number which has the same number of alphabets in its spelling as the value of the digit i.e. F-O-U-R.

4. 40 is the only number whose spelling 'FORTY' is in the alphabetical order.

5. 1 is the only number whose spelling 'ONE' is in the reverse alphabetical order.

6. If value of π is entered upto two decimals in calculator say 3.14, and look it in mirror then it looks like word 'PIE'.

7. Roman numerals have no sign to represent 0.

8. Addition of numbers present on the opposite side of the dice is always seven.

9. $111{,}111{,}111 \times 111{,}111{,}111 = 12{,}345{,}678{,}987{,}654{,}321$.

10. $-40°C = -40°F$.

**Anchal Jaiswal**
2023/MSCMAT/06

## Poetry by Anchal Jaiswal

### The Magic of Statistics

The statistician spends his days,

In figuring out the many ways,

In which a standard error can,

Enclose by bars the average man.

And having thus imprisoned him,

Perhaps at some researcher's whim,

Can with the same chicanery,

Enlarge the bars and set him free.

Or better yet, within the sample,

Locate some points with girth so ample,

That if by "choice" they were discarded,

Man and hypothesis are safeguarded.

**Anchal Jaiswal**
2023/MSCMAT/06

## Article by Anjali

## The Enchanted Land of Numeria

Once upon a time in a faraway land called Numeria, numbers and mathematical concepts lived as powerful beings. This land was ruled by Queen Algebra, who was wise and fair. Her kingdom flourished with the help of her loyal subjects: Sir Geometry, Lady Calculus, Captain Probability, and the wizard of Trigonometry, Archimedes. One day, a dark shadow loomed over Numeria. The evil sorcerer Chaos, who thrived on confusion and disorder, cast a spell that jumbled all the numbers and equations, plunging the kingdom into chaos. The rivers of equations no longer flowed smoothly, the trees of the multiplication forest wilted, and the harmony of Pythagoras Square was shattered. Queen Algebra knew that to save Numeria, she needed to assemble a team of heroes who could restore order. She called upon Sir Geometry, known for his sharp angles and perfect shapes, to rebuild the structures of the land. Lady Calculus, with her infinite ability to find limits and changes, was tasked to restore the natural flow of the equations. Captain Probability, with his keen sense of predicting outcomes, was to help the people of Numeria regain their confidence in everyday calculations. Archimedes, with his deep knowledge of the stars and angles, was to guide them all with his wisdom. The heroes set out on their quest. Sir Geometry used his tools to reshape the broken structures, creating bridges of triangles and circles that connected the fragmented parts of the land. Lady Calculus worked tirelessly, using her derivatives to smooth out the curves and her integrals to restore the balance of the natural order. Captain Probability helped the citizens of Numeria by teaching them to make informed decisions amidst the uncertainty, bringing back their trust in numbers. Archimedes stood on the highest tower, using his trigonometric spells to align the stars and guide his friends. After many trials and tribulations, the heroes managed to corner Chaos in the heart of the Pythagoras Square. They combined their powers – the precision of Geometry, the fluidity of Calculus, the foresight of Probability, and the wisdom of Trigonometry – to create a powerful formula. This formula, known as the Equation of Harmony, trapped Chaos and restored peace to Numeria. With order restored, the land of Numeria flourished once again. The people celebrated their heroes, and the importance of understanding and respecting mathematics was etched into their hearts forever. Queen Algebra declared a day of celebration every year, known as Harmony Day, where everyone would remember the heroes and the power of mathematics that saved their land. And so, in the enchanted land of Numeria, mathematics was not just a subject but a way of life, and the kingdom prospered for generations to come.

**Anjali**
2023/MSCMAT/72

## ANEMOIA by Dheeresh

A soft push, the door creaked

It must have seen better days

The scent of mould, a musky stench

Did the sunrays not come in here?

It must have seen better days

The soft murmurs were nothing but this toll

A cacophony of juxtaposed noises ringing in ear

Some must have laughed, some must have cried

It must have seen better days

The paint has peeled, the wallpaper a sorry sight

The smiling faces, the joy etched in their eyes

Sunny Sundays; a kettle, Maggi, some gossip, some spice

Lonely winters; exams, the grub, the grunge, the grind

It must have seen better days

Alone standing on the threshold, a young heart had fluttered

This was worth a lot of blood, sweat and tears

The passion, the blinding rage, the determination, the cruelling fight

Running for glory, leading the team, toiling, humming, scribbling sometimes

At the cusp of it all, a man forged in fire

It must have seen better days

It taught him to love, it taught him to defy

The will to live again, freely feel alive

On this day, I see clearly

Dear family of memories

A nostalgia

**Dheeresh Chandra**
President, SIAM DTU, 2023-24

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