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### Message from the PRO-CHANCELLOR

Today in this era of education, nobody can deny the fact that there is a significant and continuous impact of rapid modernization in our lives, as they are affected by the development in the varied fields of science and technology. These developments further lead to new challenges, research, and innovations. I strongly believe that an academic leader must have the attitude of a problem solver along with high integrity and the same is also reflected as the goal of our institute.

The Department of Mathematics has always worked towards the goal of creating an ambiance of inspiring highly noetic conversation across various disciplines and reaping knowledge via excellent teaching along with the finest research activities.

I hope that after going through the pages of the second issue of the newsletter "SANKHYA" you would have a rewarding experience. Wishing you all a happy and fruitful new year 2022.

With best regards

Prof. S.C. Saxena Pro-Chancellor

### Message from the VICE-CHANCELLOR



I am delighted to know that the Department of Mathematics, Jaypee Institute of Information Technology (IIIT), Moida is coming up with their second issue of newsletter "SANKHYA". The newsletter serves as a forum for creating an awareness about Departmental research and events. I am convinced that the Department of Mathematics is working hard, with an aim of delivering quality education to the upcoming generation and consequently contributing to the nation building.

I also congratulate the editorial team and all the members of the department who contributed directly or indirectly for this issue of the newsletter. Wishing you all great success in your future endeavours.

With best wishes, Prof. Yog Raj Sood Vice Chancellor



### Message from the HEAD OF THE DEPARTMENT

I am pleased to present the second issue of the newsletter, Sankhya, of the Department of Mathematics, Jaypee Institute of Information Technology (JIIT), Moida. Sankhya is for honoring and presenting the commitment of the faculty members and students of the Department. It showcases our dedication towards the education, skills, research, grooming, and vision of students. We do our best to offer an interdisciplinary curriculum by including concepts like Finite Element Method, Wavelets, Image and Signal Processing, etc. Even during the Pandemic, we successfully organized multiple workshops, talks, and training programs.

The Department works in pure Maths as well as its applications, providing a diverse research environment for our Ph.D. scholars. Strength of any department can be gauged by the research output of its faculty and students. The value and impact of the research work performed can be measured by the quality of journals in which they publish research, the journals our publications are cited in, etc. I am happy to share that the Department has published more than 250 journals, conferences, books, or book chapters in the last 5 years.

My heartfelt congratulations to the entire Department on publishing the second issue of our newsletter. I believe that the efforts of our faculty and students to curate the various facets of the Department in this issue of Sankhya will meet the expectations of our readers.

With my best wishes,

Prof. Alka Tripathi Head of the Department of Mathematics







### Message from the EDITORIAL TEAM

It gives us great pleasure and honor to present the second issue of SANKHYA, the newsletter of the Department of Mathematics. This publication, SANKHYA, provides insight into our Department, which strives to evolve and build its own place of excellence in teaching and research in almost all the areas of Pure and Applied Mathematics. This newsletter will also serve as a showcase for the literary and cognitive abilities of both teachers and students.

We are grateful to all of the faculty members for their help and support in making this newsletter possible. We are confident that our efforts in preparing and publishing the second issue of SANKHYA will be fruitful. We acknowledge the unwavering enthusiasm and dedication of the editorial team.

We'd also like to express our gratitude to our Pro-Chancellor, Vice-Chancellor, and HOD for their assistance which enabled us to serve this departmental newsletter committee.

Warm Wishes, The Editorial Board.



Prof. Alka Tripathi (HOD, Mathematics)





Dr. Amita Bhagat (Editor)

Dr. Shikha Pandey (Editor)



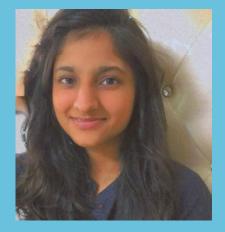
Rupali Srivastava (Research Scholar)



Payal (Research Scholar)



Neha Chandra (Research Scholar)



Avni Aggarwal (B.Tech, 1st year)





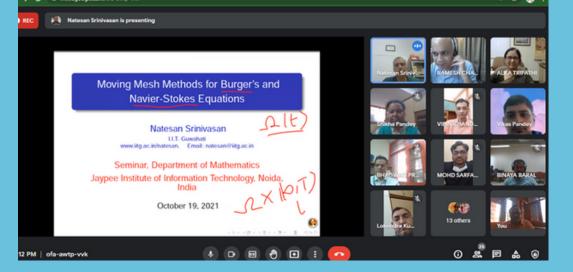
## **Events organized by the Department**

### Expert Talk,: October 19, 2021

Speaker: Prof. Natesan Srinivasan, Department of Mathematics, 11T Guwahati



Moving Mesh Methods for Burger's and Navier-Stokes Equations



Expert Talk, : December 27, 2021

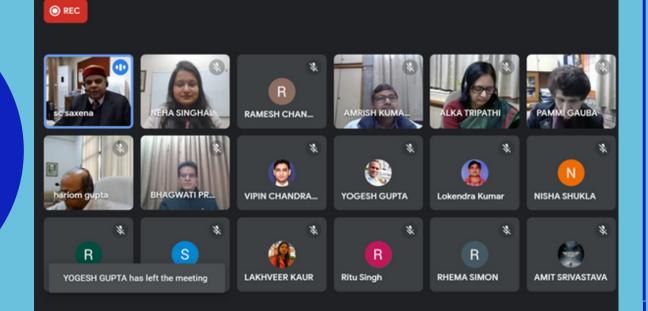
Speaker: Dr. Rajesh Kumar, Department of Mathematics, MNIT, Jaipur



# National Mathematics Day, December 22, 2021134th Birth Anniversary of Srinivasan Ramanujan



Celebration of 134th Birth Anniversary of Srinivasa Ramanujan





### 5th International Conference

01)

# Recent Advances in Mathematical Sciences and its Applications (RAMSA-2021)

**December 02-04, 2021** http://ramsaconference.com

The Department of Mathematics, JIIT Noida organized 5th International Conference on Recent http://ramsaconference.com/Advances in Mathematical Sciences and its Applications (RAMSA-2021) during December 02-04, 2021 in Online mode.

The aim of the conference was to bring together learned mathematicians, scientists, engineers, researchers, from industry and research scholars working in the different areas of mathematics. The objective behind the event is to provide a platform for the exchange of ideas regarding the research findings and new advances in the wide areas of mathematics, sciences and engineering and to discuss the practical challenges encountered in the different domains of applications and the solutions adopted thereto. Further, it will provide an opportunity to enhance collaboration among researchers not only from the various parts of the country but also from abroad. The scientific program consisted of keynole, plenary, invited lectures and parallel contributed presentation sessions. The main emphasis was on the vibrant implicational aspects of applied mathematics in relation to diverse areas of engineering and sciences.

The proceedings of the conference will be shortly published by the Mova Science Publisher after peer review process.



# **Upcoming Events**



# Teacher's Enrichment Workshop (TEW)(FEBRUARY 14-27, 2022)

The Department of Mathematics, Jaypee Institute of Information Technology, Noida in collaboration with "National Centre for Mathematics" (A joint centre of TIFR and IIT Bombay) is organizing the **Teacher's Enrichment Workshop** (**TEW**) on "Differential Equations and Mathematical Modelling", FEB 14-27, 2022.

https://www.atmschools.org/school/2022/TEW/demm



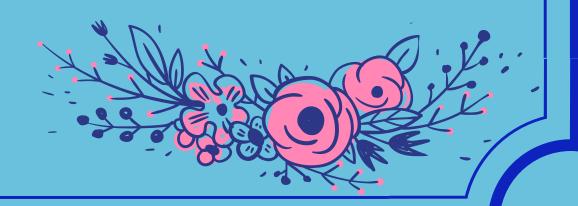
# Alumni Meet (SIGMA-2022)



The Department of Mathematics, Jaypee Institute of Information Technology, Noida is organizing its second online Alumni Meet (SIGMA-2022) on February 12, 2022.

# Publications by Faculty members July-Dec'21

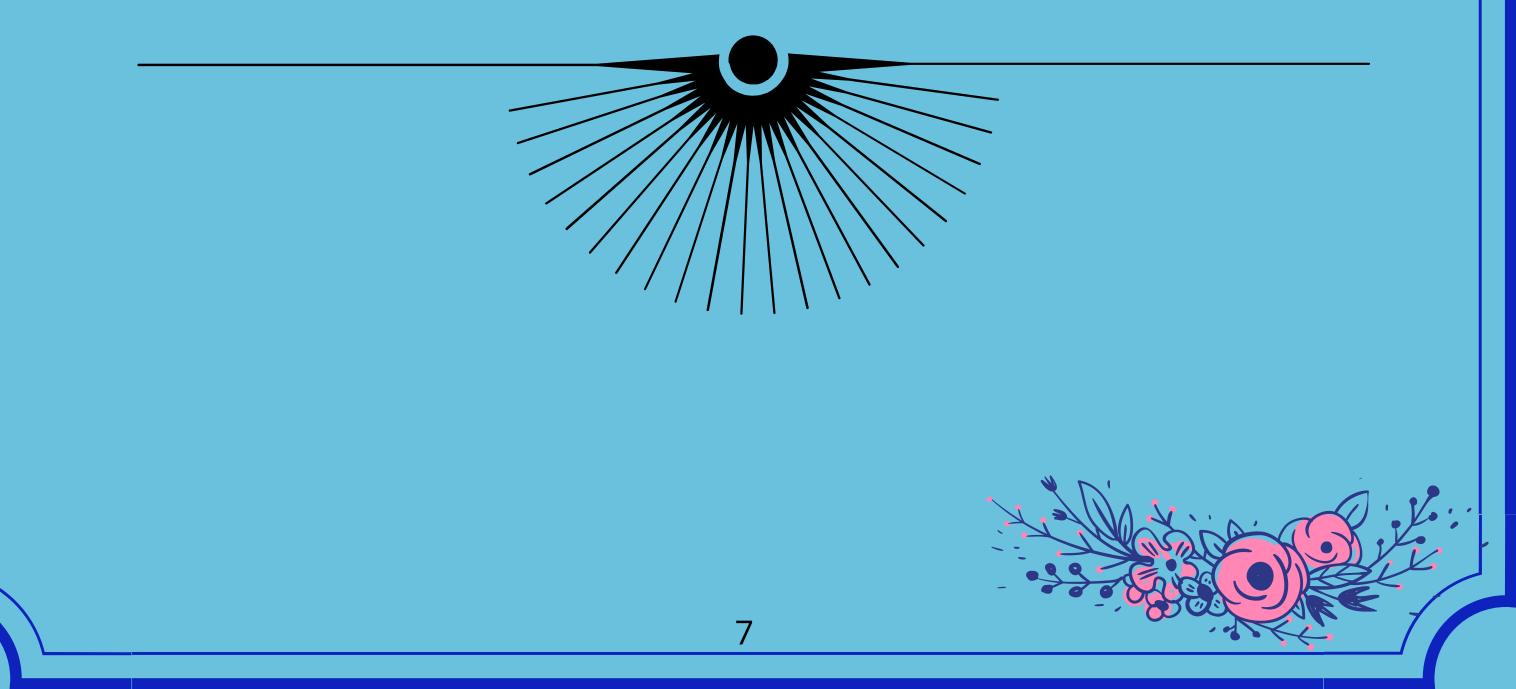
S. No.	Journal Publications
1.	Kumar M., Dubey V.C. and Sharma U.K., "Comparing entropy inspired holographic dark energy models through state finder hierarchy and growth rate of perturbations", International Journal of Geometric Methods in Modern Physics, Vol. 18, No. 12, pp. 2150195, 2021, DOI: 10.1142/S0219887821501954.
2.	Mamon A. A., Dubey V.C. and Bamba K., "State finder and $O_m$ Diagnostics for New generalized Chaplygin gas model", Universe, 7, pp. 362, 2021.
3.	Sharma U.K., and Dubey V.C., "Interacting Renyi holographic dark energy with parametrization on the interaction term" International Journal of Geometric Methods in Modern Physics, Vol. 19, Issue 1, pp. 2250010, 2021.
4.	Sharma U.K., and Dubey V.C., "Kaniadakis holographic dark energy in non flat universe". International Journal of Modern Physics D, (2022), pp. 2250013, DOI: <u>https://doi.org/10.1142/S0218271822500134</u> .
5.	Pandey S., Obradovic D., Mishra L.N., Mishra V.N., "Second order partial derivatives", Journal of Advances in Mathematics, Vol 20, pp. 419-423, 2021, DOI: <u>https://doi.org/10.24297/jam.v20i.9097</u>
6.	Obradovic D., Pandey S., Mishra L.N., "Forms of work in interactive teaching of mathematics, Research & Reviews", Journal of Statistics, Vol. 10, Issue 2, pp. 14–22, 2021.
7.	Srivastava P.K., "Nonpolynomial twin parameter spline approach to treat boundary value problems arising in engineering problems", Computational and Applied Mathematics, Vol. 40, pp.1-18, 2021.
8.	Chhibber D., Srivastava P.K. and Bisht D.C.S., "From fuzzy transportation problem to non-linear intuitionistic fuzzy multi-objective transportation problem: A literature review", International Journal of Modelling and Simulation, Vol. 41, Issue 5, pp. 335-350, 2021.



9.	Nagar P., Srivastava P.K. and Srivastava A., "A new dynamic score function
	approach to optimize a special class of Pythagorean fuzzy transportation
	problem", International Journal of System Assurance Engineering and
	Management, pp. 1-10, 2021.
	DOI: https://doi.org/10.1007/s13198-021-01339-w
10.	Nagar P., Srivastava P.K. and Srivastava A., "Optimization of Fuzzy Species
	Pythagorean Transportation Problem under Preserved Uncertainties",
	International Journal of Mathematical, Engineering and Management
	Sciences, 6, Issue 6, pp.1629-1645, 2021.
11.	Kaur R. and Tripathi A., "State Minimization of General finite Fuzzy
	Automata", International Journal of Mathematical Engineering and
	Management Sciences, Vol. 6, Issue 6, pp. 1709-1728, 2021.
12.	Nidhi and Lokendra Kumar, "Cu–Al2O3/engine oil Williamson hybrid
	nanofluid flow over a stretching/shrinking Riga plate with viscous
	dissipation and radiation effect", HeatTransfer, Vol. 52, Issue 2, pp.
	2279-2305, 2021.
13.	Singh Y. and Bisht D.C., "A hybrid method for Multi-criteria Group
	Making under Pythagorean Fuzzy Environment", International Journal of
	Modelling and Simulation, Vol.41, Issue 5, pp. 376-384, 2021.
	Book Chapter
14.	Ahlawat N., Panwar V., "Modeling and Simulation of Nano-Structured 2D
	Materials" in Advanced Applications of 2D Nanostructures. Materials
	Horizons: From Nature to Nanomaterials. Springer, Singapore., pp. 183-196,
	2021.

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### **Expert Vichar Expert Ke Sath**

Face to Face with Prof. R. C. Mittal

### अज्ञान तिमिरान्धस्य ज्ञानाञ्जन शलाकया । चक्षुरुन्मीलितं येन तस्मै श्री गुरवे नमः ॥

Prof. R. C. Mittal (Sir) is currently serving as the Professor in the Department of Mathematics at JIIT Noida since June 2018. Here, we feel delighted that via SANKHYA, we got chance to interact with the esteemed mathematician, researcher and experienced teacher whose experiences and learnings in maths and life may act as directions for all of us.



Ques 1: How do you look up your own career journey as a renowned mathematician/ researcher especially when the facilities and resources at your time of study and job were comparatively less?

I completed my M.Sc (1975) and Ph.D (1979) from IIT Delhi and I consider myself very fortunate to be associated with such reputed institutions at that time. My career journey also, I can divide into two parts viz; the first part from 1980-2000 and then 2000 onwards the second part, which had been a different life altogether.

I started my teaching career at University of Roorkee in 1980. At that time much emphasis was given to teaching than research. But I was lucky enough, as I got my first PhD scholar at 1982 and he completed his Ph.D in 1985. Thereafter, gradually I received scholars and then people solely came to know about what kind of work I do and so my journey to research continued.

Research came into importance after 5th and 6th pay commission implemented around 1995-96 and after that faculties

were paid a decent salary and it was expected from them to perform certain activities related to research, attending conferences and projects etc. Now it is more on research. But overall, the teaching job has become much better now, respectable and I must say that salary and research facilities are now better, as compared to earlier days.

## Ques 2: Sir, as of now communicating a research paper, checking its status, contacting the journal has become everyone's piece of cake; but what were the challenges that you faced when you started your research journey?

Firstly, typing was a problem, second communicating them to a journal was a problem. There were incidents like some mischievous people used to steal acknowledgements, which resulted in delay in publication or not getting required information at the right time. People had to suffer a lot because of that but now the time has entirely changed.

I must tell you that we started using computers only after 1996. During my Ph. D time, no personal computer was available, only a mainframe (a huge computer) was there at IITD. People had the facility to run the program there. I used to encode the program on punched cards using a punching machine. Running a 1000 lines code in it means to encode 1000 punching cards and if there is a single mistake in a line, then we had to encode it again, which was tough as compared to the easiness now. Nowadays, one can code and run a program very easily, in their own comfort.

#### Ques 3: What suggestions can you give to faculty members and young researchers in the direction of quality publications?

First thing is that it should be the endeavour of everyone to do their best, because येचलताहै, (This may work) attitude will not take you anywhere.

In this digital era, you are watched by so many people. Whatever you do on digital platform, a number of people read it and according to it they make a certain kind of opinion about you. So, if you don't do the quality work, nobody bothers about you, that is happening everywhere. People don't say anything, but they make an opinion about you. But if you do quality work, they may not appreciate you but in the long run it pays off. Now in this global era, everyone is given rank. There are agencies doing it. So, a good rank gives you status, a certain kind of recommendation, which everyone desires. So only novel and quality work will take you to heights and also it is essential to stay there.

## Ques 4: An Engineering student usually finds Mathematics as one of the toughest subjects in its curriculum. In that case, what directions do you give to our students so that they can enjoy learning mathematics?

Really! I don't believe that. If a student is in engineering, then he is good in mathematics. As getting into good engineering colleges without mathematics is not possible. Most of the students are good in mathematics, what they find toughest is to score marks because they are not good in problem solving. If one is good at maths, he should solve and practice problems. I remember, when I was in school, I used to practice many problems. What I am today, is possible because of that hard work. It has paid me alot.

Mostly students want to have good jobs. They pay interest to only those subjects which can give them a better job. So, without going through the theory and mathematical concepts they try to write programs, which is not possible. Logic comes from maths and science. C++, python is not Logic, it is just a language that a computer understands. Mathematics with computers is a fantastic combination, which will help them to become good engineers.

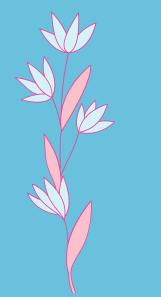
## Ques 5: What suggestions do you give to our faculty members to make the subject interesting and useful for the student in teaching mode? Can you describe the challenges you faced in your teaching career? How did you overcome it?

One should take teaching job only if they have interest in teaching, because teaching means continuous study. If you dont tell something new in class then eventually no one will be coming to your class, if it is not just for attendance's sake. If you tell the same thing, then they will start copying it from seniors or from other sources.

# Ques 6: What suggestions do you have for the supervisors dealing with Ph.D students and the research scholars so that an optimized work can be produced via mutual efforts, and better mutual understanding can be achieved as far as research is concerned?

Really, I don't want to give advice to others as everyone is wise enough. But I tell you how I see this thing. Most of the students do what guide says, they don't know much about the problem. It is the duty of the guide to show them the right path. Therefore, the guide has to be forward looking and visionary. For that matter, guide need to own the research work and work with the student as like one does while upbringing a child. Don't leave the problem on student only. Afterall it is your work and your name goes with it. So, monitor the student work closely and guide.

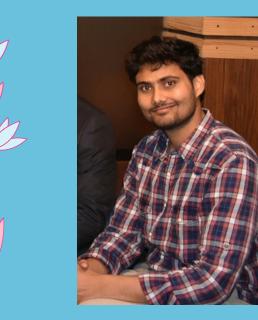


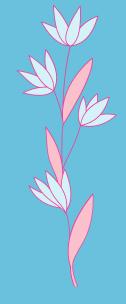




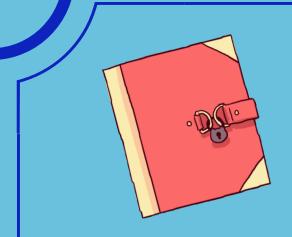








Dr. Rajanish Kumar Rai Assistant Professor



## **Penned by Students**

### **Indian Woman who redefined Mathematics in 2021**



Neha Chandra

Prof. Neena Gupta is an Indian mathematician, who has been awarded the DST-ICTP-IMU Ramanujan Prize for exceptional work in mathematics. She has been given the award for her work in the areas of affine algebraic geometry and commutative algebra. She is a scholar par excellence and a Professor at the Indian Statistical Institute in Kolkata. In 2014, she won the Young Scientist Award of the Indian National Science Academy for her solution to the Zariski cancellation problem. She is also a recipient of the Shanti Swarup Bhatnagar award (2019) in the category of Mathematical Sciences.



She is the third woman to receive the Ramanujan Prize and fourth Indian who won this Ramanujan Award prize.



Prof. Neena Gupta

प्रकृति



प्रकृति और जीवन के मध्य संदैव ही एक घनिष्ठ संबंध रहा है. प्रकृति देवदूत की तरह इस सृष्टि में विद्यमान है, प्रकृति की गोद में बैठकर ही मनुष्य ने सभ्यता का पाठ सीखा है और अपनी बुनियादी आवश्यकताओं की पूर्ति के लिए वह इस पर हमेशा निर्भर रहा है. आदि काल में मानव प्रकृति के महत्व को भली भांति समझता था और वह प्रकृति को सही मायने में साक्षात ईश्वर की दृष्टि से देखता था और यही कारण रहा है कि आज भी हम प्राकृतिक संसाधनों की पूजा करते हैं. सूर्य देवता, वायु देवता, अग्नि देवता, पृथ्वी माता, माँ गंगा आदि नाम मनुष्य की इस विचारधारा को प्रमाणित भी करते है, लेकिन जैसे-जैसे मनुष्य की आवश्यकताएं बढ़ती गई मनुष्य ने प्राकृतिक संसाधनों का दोहन प्रारंभ कर दिया यह दोहन प्रकृति के शोषण की आदित्य प्रताप सिंह तरह प्रतीत होता है.

औद्योगिक क्रांति के बाद, प्रकृति के शोषण में एक के बाद एक अध्याय जुड़ता चला गया. वर्तमान में महानगरों की वायु इतनी प्रदूषित हो गई है कि सांस लेना भी मुश्किल हो चला है. महानगरों की दमघोटू जहरीली हवा के कारण लगभग सभी आयु वर्ग के लोगों को मानसिंक और शारीरिक बीमारियों का सामना करना पड़ रहा है, जलाशयों का जल समाप्त हो रहा है, नदियां विलुप्त हो रही हैं, वनों के अंधाधुंध दोहन से पहाड़ों पर भूस्खलन की समस्या के कारण जीवन दुश्वार हो चला है. ग्लोबल वार्मिंग के कारण ग्लेशियर पिघल रहे हैं, समुद्र का जलस्तर बढ़ रहा है जिससे बाढ़ की समस्या से आए दिन सामना करना पड़ता है. असमय भूकंप का आना, जीव जंतुओं की असंख्य प्रजातियों का विलुप्त हो जाना, मनुष्य का प्रकृति से छेड़छाड़ करने के ही परिणाम है.

प्रकृति समय-समय पर मानव को सूचित करती रहती है कि अभी भी समय है. ऐसा ही एक संकेत है कोविड-19. आज समूचा विश्व कोविड-19 की महामारी से जूझ रहा है. विश्व स्वास्थ्य संगठन की माने तो यह इस सदी की सबसे बड़ी महामारी है. यह महामारी भी प्रकृति के साथ छेड़छाड़ करने का ही परिणाम है. इस महामारी से अब तक पूरे विश्व में लगभग 30 करोड़ लोग प्रभावित हो चुके हैं और लगभग 55 लाख लोग काल के गाल में समा गए हैं महामारी से निपटने के लिए संपूर्ण लॉकडाउन जैसी प्रक्रिया से विश्व के लगभग सभी देशों को गुजरना पड़ा है इस प्रक्रिया के अंतर्गत हम सभी ने ऐसा अनुभव किया है जैसे कि मानो जिंदगी थम सी गई है और समय ठहर गया है कोरोना नाम के इस ना दिखने वाले वायरस ने समस्त वैज्ञानिक ज्ञान को बौना साबित कर दिया है. <mark>वर्तमान परिदृश्य को देखकर</mark> ऐसा प्रतीत होता है कि मानो प्रकृति अपना क्रोध प्रकट कर रही हो. वर्तमान परिप्रेक्ष्य में कुछ प्रश्न हम सभी के अंतर्मन में आने चाहिए:

#### हम कहां जा रहे हैं? हम क्या कर रहे हैं? हम क्या पाना चाहते हैं?

कहीं हम अत्याधुनिकता की खोज में अपनी आने वाली पीढ़ियों का सर्वनाश तो नहीं कर देंगे ! प्रकृति हमें संकेत दे रही है कि अभी भी समय है हमें इस पर विचार करना चाहिए. किसी ने खूब ही कहा है

> विज्ञान का सदुपयोग एक वरदान हैं, इसका दुरुपयोग एक अभिशाप हैं.

## **Penned by Faculty members**

## गणित ज्ञान का है आधार

गणित ज्ञान का है आधार। जल थल नभ का कैसा आकार? ब्रह्मांड जगत का क्या विस्तार? कितने अंकों में कितना प्रस्तार? कितने अंकों में कितना प्रस्तार? मापन त्रुटि का क्या आधार? विज्ञान जगत का क्या आधार? विज्ञान जगत का क्या आधार? विज्ञान जगत का क्या आधार? जड़ चेतन में इसका विस्तार, सूचना क्रांति का यह आधार, कौशल विकास का यह आधार, करता हर समाधान साकार, नवोन्मेष हो या हो नवाचार, सत्य, सत्यता, सत्य प्रचार , सकल सृष्टि का यह विस्तार, सपने सब करता यह साकार। नभ का क्या आकार प्रकार? प्रश्नों के हल करता साकार। कैसे त्रुटि में नित हो सुधार? सुलझाए सब यह, दे उपहार। निराकार को करता साकार, उन्नति ही इसका व्यवहार। उद्योग जगत का करता विस्तार, राष्ट्र विकास का यह कलाकार। गणित सभी का प्रबल आधार, गणित ज्ञान का है आधार।



—प्रो. भगवती प्रसाद चामोला



रियाज़ी

कोइ सूरत रियाजियात से बाहिर नहीं जाती... फ़िर हो चाहे फुलों का ही खिलना... फ़िर हो चाहे जहाज़ का लहरों पे निकलना... फ़िर हो चाहे समंदर का उबलना... फ़िर हो चाहे कहकशा का मचलना...

कोइ सूरत रियाजियात से बाहिर नहीं जाती...



डॉ मुहम्मद सरफराज़

देखों किसी खेत में सूरजमुखी के फूल... देखो फ़िर उसी खेत से सूरज का निकलना... देखो किसी साहिल पे उजला सा एक चिराग... देखो फ़िर वहीं से उसका लहरों पे संभालना...

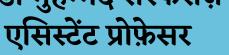
कोइ सूरत रियाजियात से बाहिर नहीं जाती... देखो बुना है जाल जिस्मों के इर्द गिर्द... देखो ज़मीन की दौर सितारों के इर्द गिर्द... देखो ज़मीन पर कैसे चलता है आदमी... देखो ज़मीर से कैसे फिसलता है आदमी...

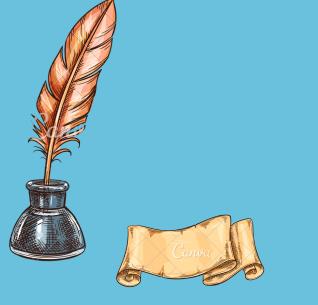
कोइ सूरत रियाजियाट से बाहिर नहीं जाती... खेलो जो कोई खेल तो गिनते थे उंगलियां... बोलो जो कोई बोल तो कहते हैं तोल कर... देखो ज़रा तुम अपनी इंफिरादी खोसोसीयत... देखो किसी नोजैदा का जिस्मेजान से निकलना...

कोई सूरत रियाजियात से बाहिर नहीं जाती...

#### शब्दों का अर्थ:

रियाज़ी मतलब गणित। कहकशा मतलब आकाशगंगा। दौर मतलब नियमित आवर्तन। इंफिरादि खोसोसियत मतलब उंगलियों के निशान। नोजैदा। मतलब नवजात शिशु। जिस्मेजान मतलब स्त्री का अंग।



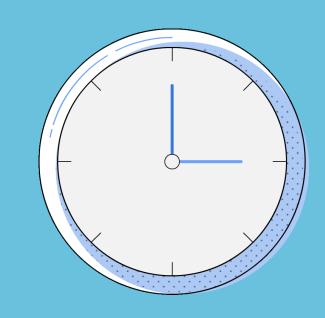




Dr. Himanshu Agarwal **Assistant Professor** 

### Accuracy- Time- Cost

Accuracy is work and data. Accuracy after deadline is useless. SPEED with low Accuracy is a sign of Danger. SPEED with high Accuracy is a DREAM. Oh Dream, please come true at any cost. Once DREAM is TRUTH then, Cost will be cut down without the worry of Accuracy. High Speed, Low Cost are the target on shine Road.



# Alumni Speak





As a research scholar, it is my great pleasure to place on record the wonderful years I had under the Mathematics Department of JIIT, Noida. I learned a lot from teachers and my senior friends during my stay in JIIT for 6 years. I started my research work under the guidance of Professor Alka Tripathi and it was completed by the end of December 2018.

I would always be thankful to JIIT for giving me a multi-

Dr. Nikunj Agarwal **Assistant Professor Department of Mathematics Jss Academy of Technical Education**, Noida

dimensional education by providing the apt mix of academics, research exposure, attitude and leadership.

My experience at JIIT University was outstanding. The faculty members here are very corporative and well educated. They always motivate and appreciate the students' hard work. I learnt a lot of things from JIIT. I got the degrees of M.Tech and Ph. D. from this university. Currently I'm working as assistant professor in JIIT. Before it, I joined GLA University, Mathura as Assistant Professor. The learning at university helped a lot to achieve this great success in my life.

Wishing a great future to all students of JIIT.



Dr. Nisha Kaushik **Assistant Professor Department of Mathematics** JIIT, Noida

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MATH IS THE LANGUAGE OF THE UNIVERSE. SO THE MORE YOU KNOW, THE MORE YOU CAN CONVERSE WITH THE COSMOS.