

2022 VOLUME-1 (Part-I)



Vision

• To strive for excellence in mathematics and promote interdisciplinary collaborative research leading to futuristic solutions.

Mission

- To empower students with mathematical knowledge that will enhance the problem-solving capability.
- To encourage faculty to engage in interdisciplinary research activity and scholarly writing.
- To give an exposure of real-world problems and methods of solving, using tools and techniques of mathematics.

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About The Department

"Mathematics as an expression of the human mind reflects the active will, the contemplative reason, and the desire for aesthetic perfection."

- Richard Courant.



The Department of Mathematics at JSS Academy of Technical Education, Noida [JSSATEN] was initiated in 1998. It is situated at the Ground floor in the Academic Block – V of the academy. The department currently has 1 Professor, 1 Associate Professor and 5 Assistant Professors with all faculty members having doctoral degree [Ph.D.] in different specializations of Mathematics. Faculty in the Department teaches Mathematics through regular and elective subjects for both undergraduate and postgraduate courses like B.Tech. and M.Tech. As a result of team effort, the department has been consistently producing excellent results. Various faculty members have published 6 text-books for the benefit of the student community and teaching fraternity and have published more than 100 research papers in journals/ conferences of international/ national repute. Over the years, the department has contributed tremendously in imparting a strong Mathematical foundation to students, a basic necessity for producing the best engineers who are now excelling in their professions not only in India but all over the world.

Principal's Desk

"Mathematics is the most beautiful and most powerful creation of the human spirit."

- Stefan Banach.

With the divine blessings of his Holiness Jagadguru Sri Sri Shivarathri Deshikendra Mahaswamiji, JSS Academy of Technical Education, Noida has been recognised as one of the best and leading technical institutes at global level. The academy's vision is to impart quality outcome based education that empowers the young generation with the knowledge, skills, research aptitude and ethical values. This will help them to solve the challenging problems of the real world. I am delighted to know that the Department of Mathematics is rolling out "Mathematrix" this semester. All the information that is summed up in this newsletter has all the necessary materials to educate the aspiring engineers about the world of mathematics and its vast dimensions. I hope that the readers will be surely benefitted by such an endeavor and congratulate Dr. Bhupender Parashar, HoD and the entire team for rolling out the first digital edition of the newsletter.

I wish them all great success.

HoD's Desk

"If you want to know what's true, then math is a pretty good place to start"

- Dennis P. Sullivan.



Mathematicians are making lasting contributions to society by solving realistic problems in diverse fields such as medicine, agriculture, management, economics, government organizations, computer sciences, engineering, technology and social sciences.

During this global crisis due to the COVID-19 pandemic people suffered tremendous disruptions, pains, and fears. The physical suffering, the isolation, and the compelling demands to care for others in new ways deepened. The challenges faced by faculty and students in teaching & learning were met with the integration of technology to give students a classroom feeling. Faculty members of the department have extended support to students by being available almost 24×7 to clarify their doubts even on one to one basis.

The Faculty members in the Department of Mathematics are actively engaged in research in all major areas of Pure and Applied Mathematics. They regularly participate/deliver/invite talks in National and International Conferences / Symposia / Workshops . In order to improve the quality of Education and Research, the Department of Mathematics organizes Seminars, Conferences, Workshops and Symposia periodically.

Mathematrix aims to highlight useful mathematical tools, techniques, tips & tricks in learning Engineering/Management related Mathematics and hope that it will greatly benefit all its readers.

Dr. Bhupender Parashar HoD Department of Mathematics

First Year Coordinator's Desk

"Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding."

- William Paul Thurston



I am profoundly happy to write for this inaugural issue of the newsletter initiated by the Department of Mathematics. My heartfelt thanks and congratulations to all my faculty members from the department and all students for bringing this issue to the upfront. As First Year Coordinator, I always have felt proud when I see my colleagues and my juniors working hard and moving towards the path of upliftment and success. I offer all my support to the faculty members for this endeavor also.

I am quite sure that the current issue will help the department of Mathematics in achieving the objective to bring forth few of the advancements in the field of Mathematics. Also I am sure that this effort will help faculty and students to pool their ideas and with each new issue of the newsletter, they will move towards perfection. I am also hopeful that this newsletter will provide sufficient content to our enthusiastic learners i.e., our students and it eventually would help them create and sustain their interest in the area of Mathematics.

As the B.Tech. First Year coordinator, my task is to coordinate among various departments faculty teaching First Year as well as guiding and mentoring students with the help of class coordinators, I also keep my pace high to match with the pace of my budding students. I aspire that my team members also would do the same while bringing every issue of this newsletter and fulfill the demand of the hour by providing relevant material to quench the curiosity thirst of our readers.

It is my pleasure to be part of the newsletter for the Department of Mathematics. I congratulate the entire editorial team of the Mathematics newsletter headed by the Head of the Department, Dr. Bhupender Parashar and Dr. Ranu Pandey for their excellent initiative. My good wishes are with the entire team of newsletter 'Mathematrix'.

Editor's Desk

"Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country."

- David Hilbert.



It's a matter of immense pleasure to launch the first digital edition of 'Mathematrix', the Newsletter from The Department of Mathematics. Mathematrix has come up as a result of the enormous efforts, hard work, dedication and patience that's put in by our editorial team under the able guidance of our respected HoD, Dr. Bhupender Parashar, my special mention to the young brigade, our students Anubhavi, Indira, Nandini, Palak, Pradhumn, Raghav and Rishi. Its purpose lies in encouraging creativity of thoughts, power of expressions, and helping students to understand the importance and value of mathematics so that they comprehend, learn and grow in every aspect relating to the subject. In the first digital release, we offer a wide range of articles including the ones from the experts, a few offerings from our current engineering undergrads and special write-ups from our distinguished alumni Aman Gupta and Rishabh Chaudhary. This edition witnesses ample engrossing Puzzles, BrainTeasers, a great deal of Current Affairs, scores of opportunities in the field. It includes a glimpse of the activities as well which turned out this session.

I extend my heartfelt gratitude to our Hon'ble Principal (I/C) Dr. T. G. Mamtha for rendering her support and for giving assent to the Newsletter. I offer special words of thanks to our First Year Coordinator Prof. Z.K. Ansari for always being the inspirational source. This task would have been incomplete without the support of fellow faculties of the Department and indeed without the entire editorial team of Students. The newsletter has been conceptualized, innovated and digitally designed by the students and I appreciate their outstanding efforts in releasing the first edition timely. Once again, I extend my sincere thanks to each and everyone who has been associated with it head on or circumlocutorily for putting all his/her efforts into its successful release. I firmly believe that **Mathematrix** would prove to be a milestone for all our young engineers.

Looking forward to getting the valuable feedback and suggestions which eventually would help us improve and come up with finer content and tweak design for the forthcoming issues as we aspire to bring perfection and be roads ahead with the progress of time.

Wish you all a joyful learning and Good Luck!!!

Role Of Mathematics

"One of the endlessly alluring aspects of mathematics is that its thorniest paradoxes have a way of blooming into beautiful theories."

— Philip J Davis

Mathematics is one of the oldest academic subjects and is one of the most mature and well-developed disciplines of basic sciences. The role of mathematics in engineering is crucial. The most important branches of Mathematics applicable to Engineering are Linear algebra, Geometry of two and three dimensions, Trigonometry, Calculus (real, vector and complex), and Differential equations. Civil Engineering depends greatly on Geometry, calculus both real and complex. Computer Science (Information Technology) and Engineering is largely dependent on Algebraic structures, combinatorics logic and number theory all of which are covered under Discrete Structures. Mechanical and Electrical Engineering heavily utilize calculus, linear algebra, differential equations and Numerical analysis. Electronic and Communication, Instrumentation and control engineering employ integral transforms and techniques (Transform methods). Advances in mathematical control theory have led to improved manufacturing process control. Applications are seen in chemical process manufacturing and metal processing. The rapid increase of computational capabilities and an increasingly quantitative approach to problem solving is transforming the manufacturing world.

Opportunities

"The only way to learn mathematics is to do mathematics."
- Paul Halmos

- 1. Abel prize in mathematics: https://phys.org//news/2022-03-topology-chaos-theorist-mathematics-abel.html
- 2. International Math Olympiad: https://www.imo2022.org/imo/Home

News Of The Department

"As far as the laws of mathematics refer to reality, they are not certain, and as far as they are certain, they do not refer to reality."

- Albert Einstein.

Webinars Organized by The Department of Mathematics

• International Webinar - 2021



"Introduction to MATLAB"

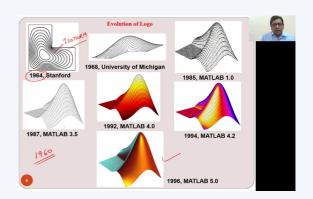
On the occasion of 106th Jayanthi Celebrations of Srimanmaharaja Rajaguruthilaka His Holiness Jagadguru Sri Sri Shivarathri Raiendra Mahaswamiji, with the divine blessings of his holiness Sri Shivarathri Jagadguru Sri Deshikendra Mahaswamiji, JSS Mahavidyapeetha, Mysuru; the Department of Mathematics, JSSATE Noida organized an International webinar on the topic "Introduction to

MATLAB" on 17thSeptember 2021 (Friday) at 10.30 A.M. (IST).

The resource person of this webinar was Dr. Puneet Rana, Assistant Professor of Mathematics at the Wenzhou-Kean University, Wenzhou, China. He has more than 10 years of teaching and research experience. He received his Ph.D. degree in the field of applied mathematics with specialization in

"nanofluids" from Indian Institute of Technology Roorkee, INDIA in 2013. He was awarded "research fellowship" for pursuing higher education by CSIR, INDIA and travel grant for attending various international conferences by INSA and DST, INDIA.

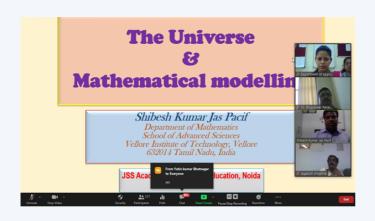
The webinar was highly appreciated by the participants present during the session. A total of 343 enthusiastic participants across the world (6 other countries in



addition to Indian nationals) joined the highly informative meticulous session delivered by the distinguished presenter.

• National Webinar - 2020

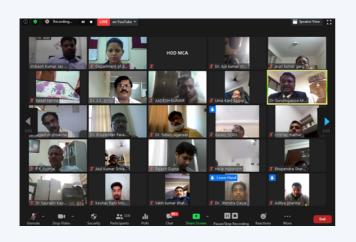
"The Universe and Mathematical Modeling"



The department of Mathematics organized a national webinar on the topic "The Universe and Mathematical Modeling" on 11th June 2020 (Thursday) at 11.00 A.M.

The speaker/ presenter of the session was Dr. Shibesh Kumar Jas Pacif, Senior Faculty in the school of Applied Sciences, Vellore Institute of Technology, Chennai. He is Ph. D.

in Mathematics from Banaras Hindu University, Varanasi, specialized in Relativity and Cosmology with more than 15 years of teaching experience. He has been awarded with NBHM post–doctoral fellowship from the Department of Atomic Energy, Government of India. He has worked in the Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi. He has published many research papers in the highly reputed journals and also the reviewer of various esteemed



journals like Classical and Quantum Gravity, Canadian Journal of Physics and many more. He has delivered more than 20 talks nationally as well as internationally.

The presenter very systematically elaborated about the Universe, the concept of cosmic web, solar system, through videos and PPTs. He explained the cosmological scale of the universe with Mathematical Modeling. The

webinar was tremendously appreciated by the participants present during the session. The success of the webinar was reflected by the participation of a total of 350 participants.

Research Papers:

- Bhupender Parashar, "Neural Network Auto Regression and Classical Time Series Approaches for Rice Yield Forecasting", is published in The Journal of Animal and Plant Sciences (JAPS) 31 (4) 2021, WoS Journal. Impact factor: 0.59 https://doi.org/10.36899/JAPS.2021.4.0310
- Bhupender Parashar, "Computational Study Reliability of Diesel Engine through Electrical Assembly" is published in The International Journal of Integrated Engineering, ISSN: 2229-838X e-ISSN: 2600-7916, WoS Journal. Impact factor: 0.85 https://doi.org/10.30880/ijie.2021.13.06.015
- Z.K. Ansari, "Optical and upconversion properties of bismuth tellurite glasses Co-doped with Er3+-Yb3+ ions", Materials Today: proceedings 2021. (Scopus)
- Ranu Pandey, Bhupender Parashar, Vinita Khemchandani, "Modeling and Reliability Analysis of Power Cables Used as a Two Unit Hot Standby System with Preference of Repair over Replacement in the Metro Railways", International Conference on Mathematical Sciences: Journal of Physics Conference Series, doi:10.1088/1742-6596/1770/1/012089, 2021. J. Phys.: Conf. Ser. 1770 012089. (Scopus)
- Nikunj Agarwal, "Multiple attribute group decision-making based on generalized aggregation operators under linguistic interval-valued Pythagorean fuzzy environment", Granular Computing, 2021. (WoS).
- Nikunj Agarwal, "Decision making model based on fuzzy AHP and TOPSIS using weakest t-norm operations", Annals of Optimization Theory and Practice, 2021.
- Z. K. Ansari, "Some Fixed Point Results in Menger Space Using the Notion of CLR and JCLR Property", Journal of Advances and Scholarly Researches in Allied Education Vol.17, Issue No. 2, 202-208, October -2020.
- Z. K. Ansari, "Some fixed point results in parametric metric space", J. Math. Comput. Sci. 10, No. 6, 3143-3158, 2020. https://doi.org/10.28919/jmcs/5039 ISSN: 1927-530. (Scopus)
- Shalini Singh, "An accelerating cosmological model from a parametrization of hubble parameter", Modern Physics Letters A, Vol 33/ No.1, PAGE No-2050011(16 Pages), 2020, DOI:10.1142/S021773232050011X (Scopus, WoS & SCI, IF:1.391)

- Ranu Pandey, Bhupender Parashar, Vinita Khemchandani, "Comparative Analysis
 of reliability models of an electric wire (33 KV) used in metro railways under
 inspection policy" in National Seminar on "Mathematical Sciences: Repositories of
 Logical Thoughts and Analytical Tools" organized by CCS Haryana Agricultural
 University, Hisar and sponsored by DST, Haryana, 22nd December 2020.
- Bhupender Parashar, "Imperfect Maintenance Modeling for Sequential Corrective & Preventive Maintenance" is accepted to be published in AIP Proceedings of National Conference on Applied Sciences and Mathematics (NCASM-20), held on 24th - 25th September 2020 at Chitkara University, Punjab (India).
- Bhupender Parashar, "Principal Component Analysis for the Assessment of Genetic Diversity" is accepted to be published in AIP Proceedings of National Conference on Applied Sciences and Mathematics (NCASM-20), held on 24th - 25th September 2020 at Chitkara University, Punjab (India).
- Anushri Verma, "Thermal Effect of Compressible Rivlin Ericksen Fluid Permeated with Suspended Particles in Porous Medium", 2nd National Conference on Recent Trends in Mathematics with Applications, January 30-31, 2020, organized by Shri Ramswaroop Memorial University, Lucknow.



-What is the smallest number that, when divided successively by 45, 454, 4545 and 45454, leaves the remainders 4, 45, 454, and 4,545 respectively?

Faculty Achievements

- A candidate has been awarded with a doctoral degree under the supervision of Dr.
 Z.K. Ansari in the year 2020.
- A candidate has been awarded with a doctoral degree under the supervision of Dr. Bhupender Parashar in the year 2020.
- Dr. Ranu Pandey was awarded a Ph.D. degree on the subject Reliability Theory, Bhagwant University, Ajmer in the year 2020.
- Dr. Ranu Pandey won the *Best Oral presentation* award in a national seminar organized by the Department of Mathematics & Statistics, CCS Agricultural University, Haryana in the year 2020.
- A book published on "Differential Equations" (ISBN: 978-81-943378-2-9) jointly by Dr. Vinita Khemchandani and Dr. Ranu pandey in the year 2020.
- Dr. Nikunj Agarwal qualified the quiz with an honor grade on "Covid-19 Awareness" organized by the IQAC-cell, Brahmanand PG College, Hamirpur 2020.
- Dr. Vinita Khemchandani delivered two lectures in the Amity University on the topic, "Real life applications of Fourier series and Transforms" and "Real life Application of Partial Differential Equations" in the year 2021.



-What number composed of nine figures, if multiplied by 1,2, 3,4, 5, 6, 7, 8, 9, will give a product with 9, 8, 7, 6, 5, 4, 3, 2, 1 (in that order), in the last nine places to the right?

Expert Speaks

"Without mathematics, there's nothing you can do. Everything around you is mathematics.

Everything around you is numbers."

- Shakuntala Devi.

Indian Engineering/Professional Education Current Scenario-Prof. (Dr.)Chandrasekhar Salimath



Closure of as many as 200 engineering colleges in the post covid era has raised questions among others, is engineering education losing its sheen? The answer partially lies in the breaking news: The All India Council for Technical Education (AICTE) will extend the ban on new engineering institutes in the country by another two years, until 2024, in view of the 45% seat vacancy reported across engineering institutes across India in 2020. A couple of decades ago, almost every Indian school student had just one of two dreams – become a doctor or an engineer. If you were not good enough to get one of these coveted seats, you had to content yourself with some other 3 year degree. An engineering college used to be the ultimate temple for thousands of students with stars in their eyes. Twenty

years later, the tables have all but turned. Dozens of engineering colleges across the country are shutting down because their seats lie vacant. Covid pandemic has been proved to be the final nail in the coffin for ailing technical institutes. This is in spite of lowered cut off marks and enormous efforts at advertising by colleges. Why has engineering as an attractive option faded so drastically? The answer is not hard to find. Lack of jobs after engineering and inadequacy of skills to pursue a successful career are the reason why students think an engineering degree is just not enough to help them stand on their feet after education. The industry and society however, sorely need engineering talent. How then, can we produce the kind of engineers that make industries competitive, and who contribute to building and growing strong societies? Here are some suggestions to make engineering an attractive educational option again:

Student Development Program (SDP)

1) **Practice problem-solving:** An engineer's basic job description is to be a problem solver. The more problems you solve, the better you will get at it – you cannot mug theory to get great at problem-solving. Mere knowledge of IC engines alone cannot help you repair a car stuck on the highway – he needs to explore the system himself, find the fault

- **2) Learn for knowledge:** Right from schools, our intention to learn is to get decent report cards. Unfortunately, a great grade card does not make a good engineer! Learning for the sheer joy of knowing something new, getting through with fundamentals, and exploring how that knowledge is used in the real world is what a good engineering education system fosters and incidentally, gives the student good grades too.
- 3) Practice integrated thinking: An engineering problem cannot be solved by using one concept only. You cannot build a railway track with knowledge of just engineering materials, or build a car with just knowledge of kinematics. What an engineer needs to learn is to integrate his knowledge of various engineering concepts, think of the problem as a system rather than an isolated event and then proceed to solve it.
- 4) Industry exposure: Internships and working on projects with core engineering companies is crucial for the student to gain exposure to working on real time engineering scenarios. Gaining industry experience before actual work experience has now become indispensable for an engineer's career preparation.
- 5) Ability to communicate effectively: Graduates of engineering programs today need significant "soft skills" in addition to technical expertise, if they are to be effective for their industrial and corporate sector employers.

Faculty development program (FDP)

A great teacher is also a great student. Not only will he have excellent knowledge of subject matter, he keeps upgrading his skills and learning newer ways constantly to then pass on to his students. Faculty interaction, mentoring, engaging faculty to work or consult on projects and other similar opportunities bring industry exposure to faculty, which then make their classes both exciting and meaningful for their wards. It goes without saying that the industry fraternity can contribute enormously to engineering education. All these suggestions here are well within our reach. This effort will pay off manifold for students, for engineering institutions and for industries – the world needs good engineers! "Popular courses among students at present are the new age courses including artificial intelligence (AI/ML) and data science among others, especially because of the jobs being offered in these sectors. FDPs on AI/ML is the need of the hour. To summarize, while the nation has created the capacity to generate engineers in large numbers, the average quality of an engineering graduate is well below acceptable norms due to inflexible curriculum, low employability in industrial and IT sectors, lack of quality education and training etc.

*The author has served as Professor and Principal in engineering and science colleges of Karnataka and Uttar Pradesh.



In 1995 in Taipei, citizens were allowed to remove '4' from street numbers because It sounded like 'death' in Chinese. Many Chinese hospitals do not have a 4th floor.

Alumni Corner

"The definition of a good mathematical problem is the mathematics it generates rather than the problem itself."

- Andrew Wiles.



I am **Rishabh Chaudhary**, currently pursuing my master's in the **Mechanical Engineering** department at Thapar University, Patiala. I completed my graduation from JSSATEN in **2016-2020**. My area of interest is vibrations and sensors. I will be joining Tufts University in the USA in the month of September as a doctoral candidate, where my primary task will be the development of sensors used in space. I am always curious about the numerical approach wherein mathematical tools are deployed to solve problems in the field of engineering.

As an essential tool, mathematics is utilized in all areas of study, and I am always delighted to have a deep interest and guidance in this subject. It has always been helpful in establishing and quantifying concepts, analyzing observations, and presenting unambiguous scientific findings throughout my projects and research career. It allows an understanding of how real-world problems are postulated and solved in engineering. This language of numbers is the language of the century that all sciences share, where the solutions to big questions always begin from an elementary concept. I always use to implement whatever I learn as it makes the perpetual learning process easier and interesting.

I congratulate the entire team of JSSATE, Noida-Mathematics Department, for starting the newsletter of the department. I am also thankful to them for giving me an opportunity to be part of this inaugural issue and write on my subject of interest.

Feel free to reach me at: rishabh980873@gmail.com



From 0 to 1,000, the letter "A" only appears in 1,000 ("one thousand").

A 'jiffy' is an actual unit of time for 1/100th of a second.

"Mathematics is the music of reason." – **James Joseph Sylvester**Mathematics and Reality



I am **Aman Gupta**, an alumni of JSS Academy of Technical Education, Noida, Batch **2016-2020**, from the Department of **Information Technology**, with specialization in Machine Learning. I am currently doing MSc. in Physics from IIT Roorkee, with specialization in Quantum Computation.

Mathematics has played a very crucial role in my life. I have been an advocate of mathematics for as long as I can remember, strangely

enough I don't know the exact reason for it, maybe it's because of the simplicity, elegance and beauty that it constitutes or maybe because how logically everything is written down with only the most basic assumption; no other existence in this universe has such features, and yet mathematics is still incomplete and inconsistent, which is proven by mathematics itself. I think most who like mathematics follow the same reasoning. My first love-hate relationship with mathematics started with 'Euclid's Axioms and Postulates', I mean, why is mathematics so abstract and why do obvious things have to be written down, right? And I was asking it to a person who was living on a curved surface and "WHY" imaginary numbers, mathematics, why are you so abstract, learn to live in the real world like science. Gradually many disjunctive pieces(calculus, linear algebra, group theory, etc.) that I learned started to coalesce and form a very beautiful description of reality. Many people often ask, when will I ever use this monstrous equation in my life, believe me you will use it or someone else will use it for you, to make your life possible and livable. I think the universe speaks in the language of mathematics and firmly believe that the universe is just a simulation, well then being an IT engineer believe me you have nothing but mathematical models of this universe.

There have been many moments in my life when I was just blown away by some piece of mathematics, one such moment I can remember was in my B.tech 3rd semester, 1st class of Mathematics 3 and I was told the mapping of one complex space to another complex space via operators, it was so simple but I don't know why I still remember that moment to be very enlightening.

I wholeheartedly appreciate the efforts taken by the JSS department of Mathematics for releasing the newsletter and glad for giving me the opportunity to be a part of the alumni column.

Feel free to reach me at: a gupta@ph.iitr.ac.in

Star Performers

Students Scored 95% and above in the End Semester Examinations AY:2020-21

S.No	Name of the student	Branch	Semester	Mathematics Score
1	Ritika Garg	CSE	I	96
2	Anant Mishra	CSE	1	97
3	Ayushi Sahu	CSE	I	98
4	Pankhuri Srivastava	CSE	I	97
5	Sandeep Mukherjee	CSE	I	95
6	Parisha Thapar	CSE	I	99
7	Diwakar Chauhan	CSE	I	96
8	Yeshit Gupta	CSE	I	98
9	Sachin Tripathi	ECE	1	99
10	Abhay Agrawal	EC	I	96
11	Anmol Verma	ME	I	95
12	Saksham Sharma	EC	I	95
13	Kapil Kumar	EE	1	98
14	Aanchal Saxena	CSE	I	100
15	Yash Tiwari	CSE	I	95
16	Prince Gupta	CSE	I	95
17	Diwakar Chauhan	CSE	II	96
18	Piyush Yadav	CSE	II	98
19	Harshit Keshri	CSE	II	96
20	Khushi Sangal	EC	III	98
21	MD Ali Anwar	EE	VI	100
22	Ishu Yadav	EE	VI	100
23	Rahul Namdev	EE	VI	100

Student Volunteers-MATHEMATRIX

