Inside...

Message from the Pro-Chancellor

I am indeed happy to know that the Department of Mathematics is going to bring out its second volume of newsletter "SANKHYA". The issue of the newsletter contains all departmental activities including its achievements. Mathematics is the foundation of all Sciences, Engineering and Technologies and provides firm foundation to students for working logically and findings solutions for the problems being tackled by them.

I appreciate the efforts of Editorial team of the Mathematics Department for bringing out this issue.

With best wishes,
Prof. S.C. Saxena
Pro-Chancellor

Message from the Vice-Chancellor

I delightfully felicitate the Department of Mathematics for releasing its newsletter "SANKHYA", Vol 2, Issue 1. The Department is continuously striving towards the intellectual and strategic growth of the institute and SANKHYA serves as a great platform to reflect their ideas and connect with the Alumnis. I hope this newsletter will act as the mark of achievements, capabilities and strengths of the department.
My best wishes to the department and editorial team.

With best wishes,
Prof. Yog Raj Sood
Vice Chancellor

Message from the Head of Department

I feel ecstatic to present the next issue of "SANKHYA", the newsletter of the Department of Mathematics. With a setup of around 25 faculty members, the department is working hard to achieve the goals of the Institute of providing education and knowledge. This newsletter showcases the activities, efforts and achievements of the department. I am thankful to the Editorial Team for putting in their consistent efforts to bring this issue of "SANKHYA".
I hope that you all will have a pleasant experience while reading this issue.

With Best Wishes
Prof. Alka Tripathi
Head, Department of Mathematics
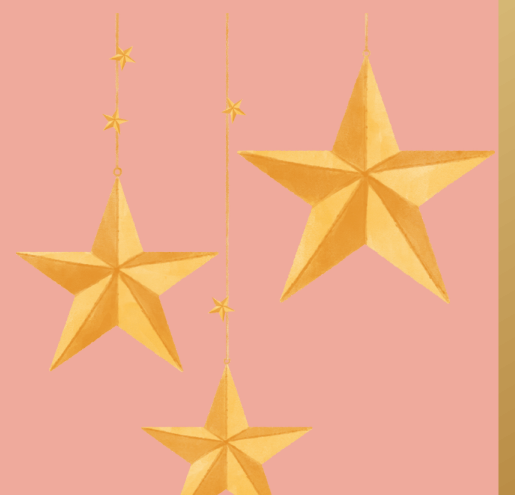
Message from the Editorial Team

Editorial team of "SANKHYA" proudly presents to you Volume 2, Issue 1 of the Department of Mathematics Newsletter.

Newsletters act as a medium to disseminate knowledge, information, achievements and also act as a source of motivation to work harder and brighter. They keep us connected even being physically distant as during the time of pandemic. The last six months had been very crucial to all students and faculty members as we all were recovering from the waves of COVID-19. We have successfully translated from online academic activities to fully offline mode. This newsletter gives an insight about all departmental activities and also bridges a gap between JIIT and our Alumnis. SANKHYA is a platform to proudly announce our achievements, activities and updates in the journey to success of the Department of Mathematics. We hope it will meet the readers' expectations.

Warm Wishes,
The Editorial Board.

Prof. Alka Tripathi
(HOD, Mathematics)

Dr. Amita Bhagat
(Editor)

Dr. Shikha Pandey
(Editor)
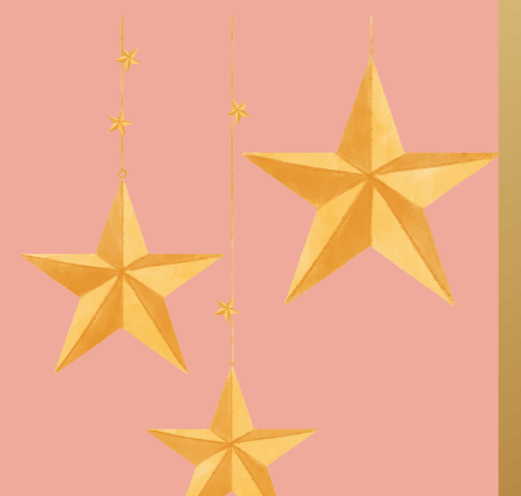
Events Organized by the Department

Career Guidance Seminar
January 10-15, 2022

The Department of Mathematics at JIIT Noida organized Career Guidance seminar from Jan 10-15, 2022 with an aim to prepare M.Sc. students for competitive exams. Many experienced speakers from department has delivered lectures in this series of seminar of 5 days. Faculty members and alumni shared their views and experiences as well as provided tips to crack CSIR-UGC NET/ GATE and other competitive exams with the students. The event was indeed a success, as students of course got benefitted with the profound knowledge of experts regarding subject and career direction.
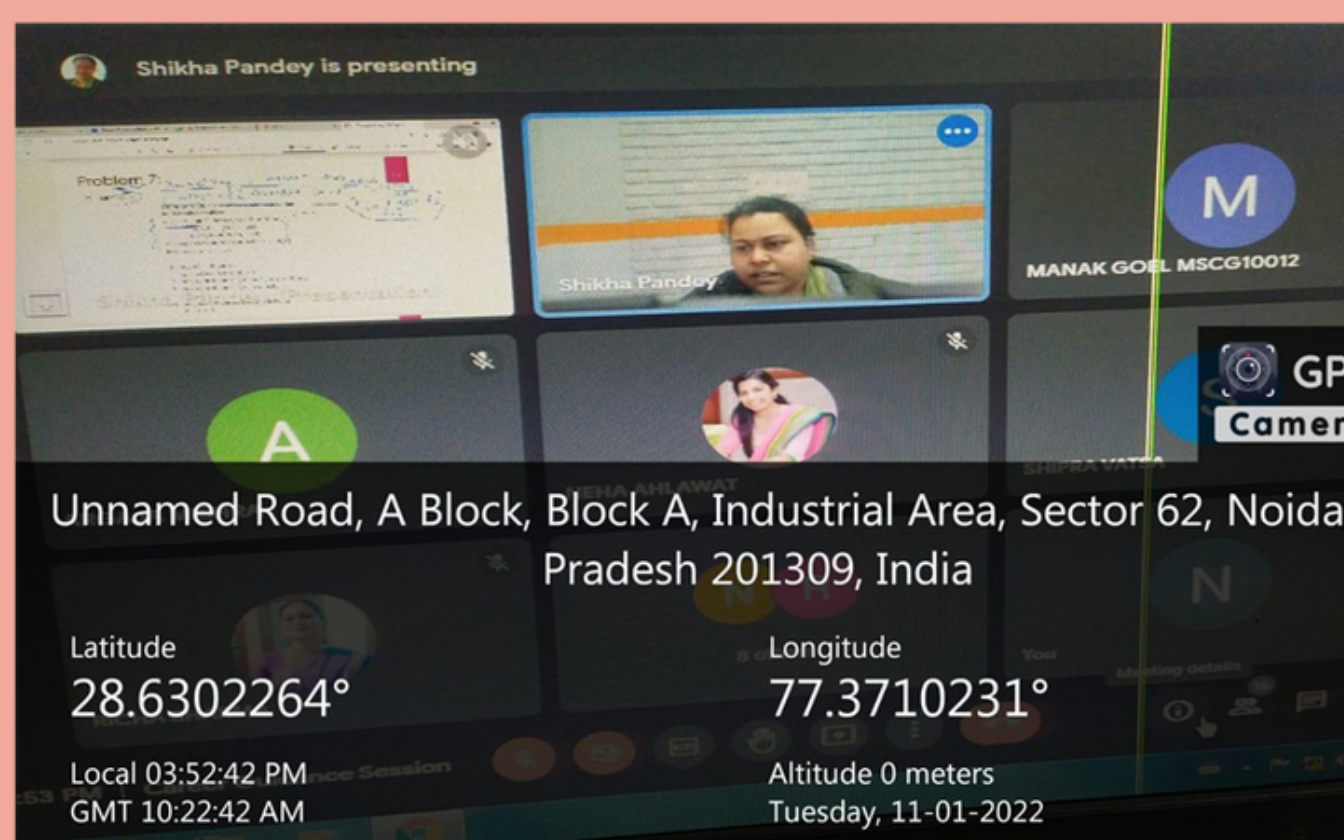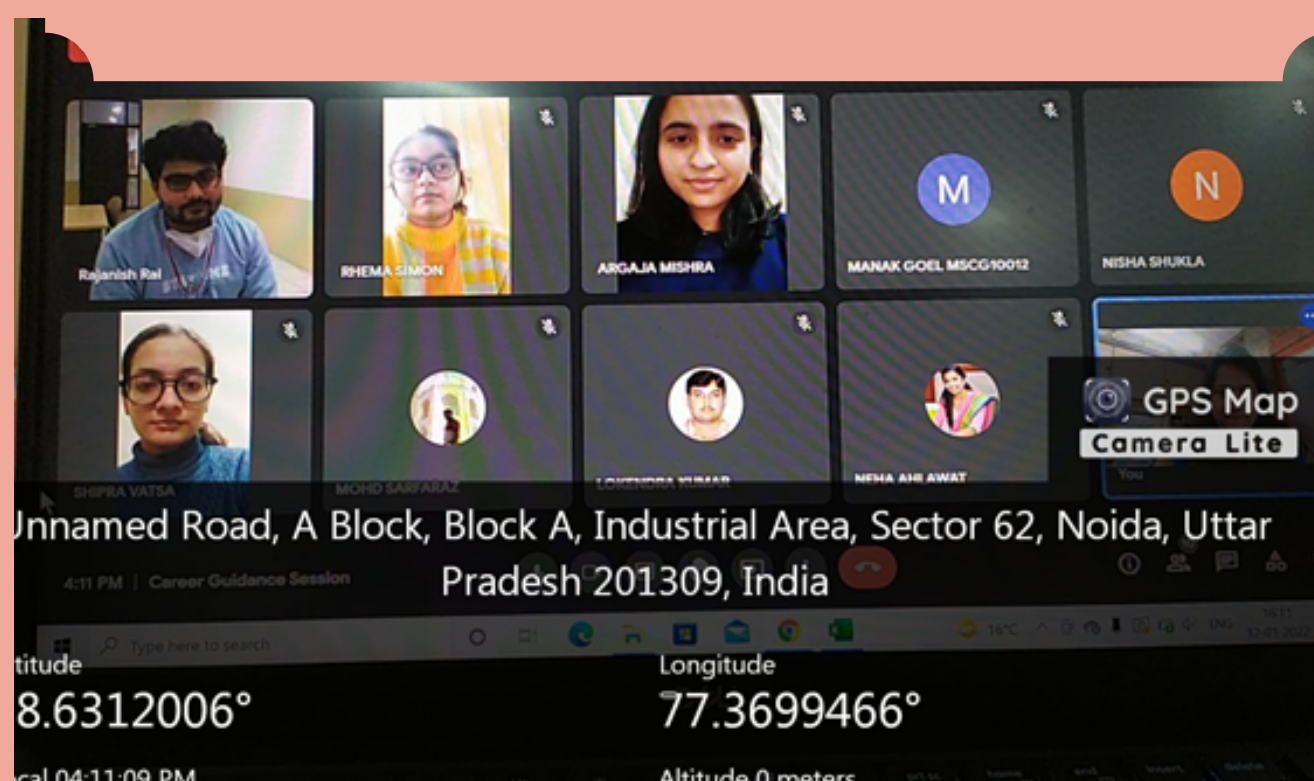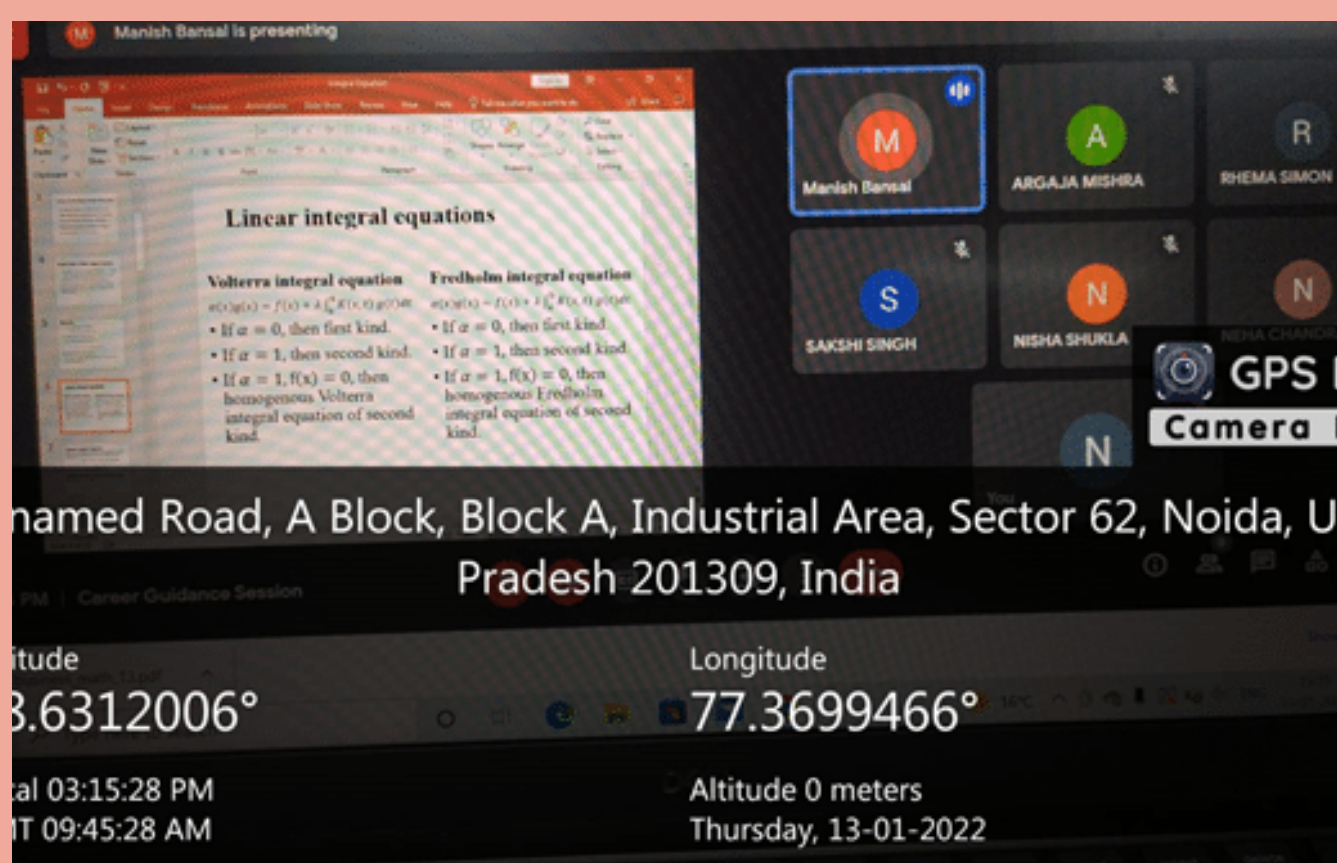
Organizer:
Dr. Neha Singhal
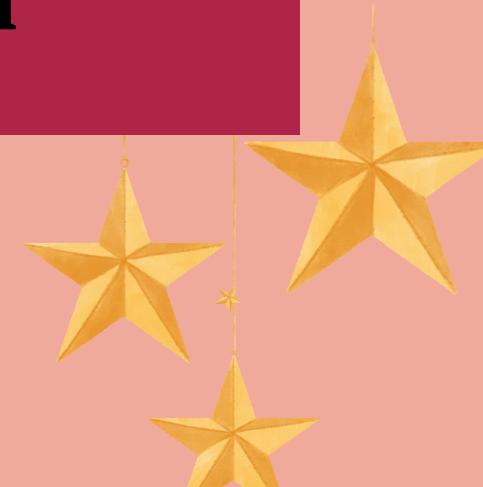
Alumni Meet
"SIGMA(FEB)–2022"
February 12, 2022

The Department of Mathematics at JIIT Noida organized online alumni meet "SIGMA (FEB)-2022" on February 12, 2022. Several alumni and faculty members participated in this meet. Honourable Vice chancellor Prof. Yog Raj Sood Sir addressed the gathering by his words of wisdom. The participants enjoyed the meet as they got a chance to meet their old friends, faculty members after a long span even in this pandemic via virtual mode. They shared their happiness in the form of feedback and actively participated in this meet. Prof. Alka Tripathi, HOD, Department of Mathematics discussed the achievements of the department and also discussed the plan to contribute towards the welfare of the alumni. Overall, the session was interactive.

JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY
NOIDA
Department of Mathematics
Cordially Invites for
ALUMNI MEET

SIGMA(F&B)-2022

Date: February 12, 2022
Time: 11 am
Google Meet Link: meet.google.com/gih-nerx-aje
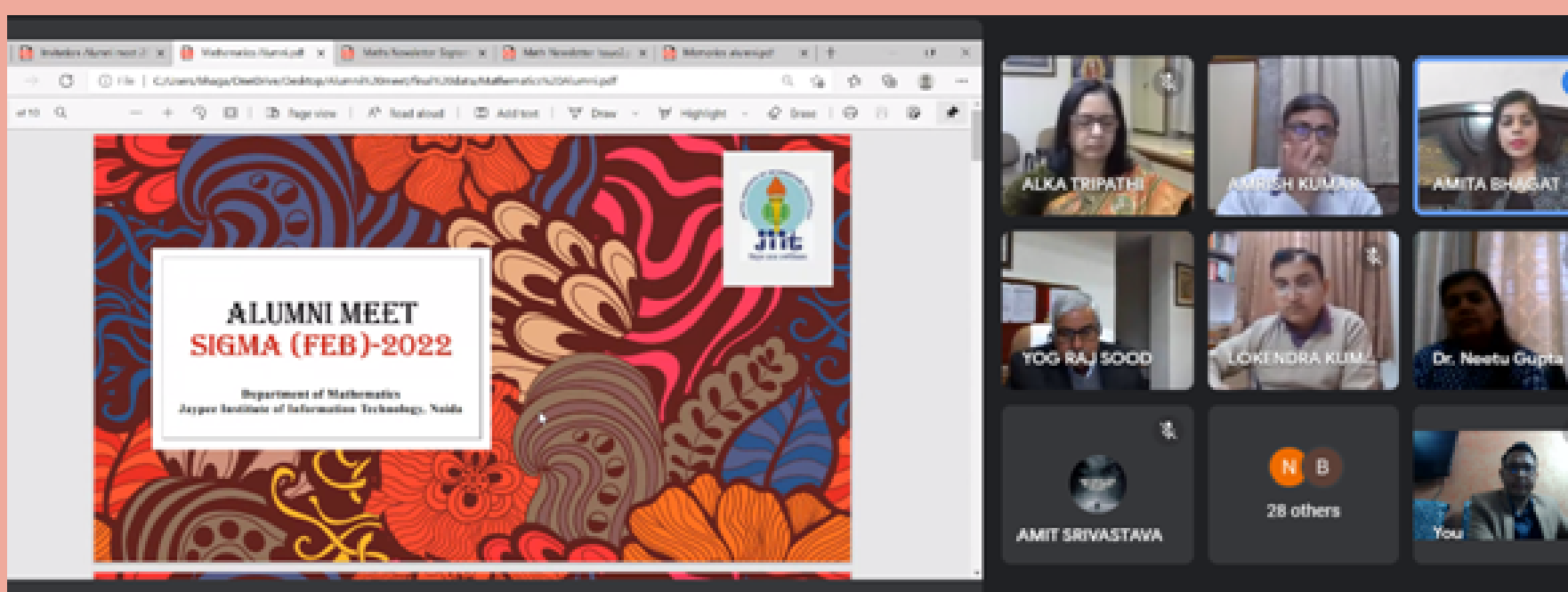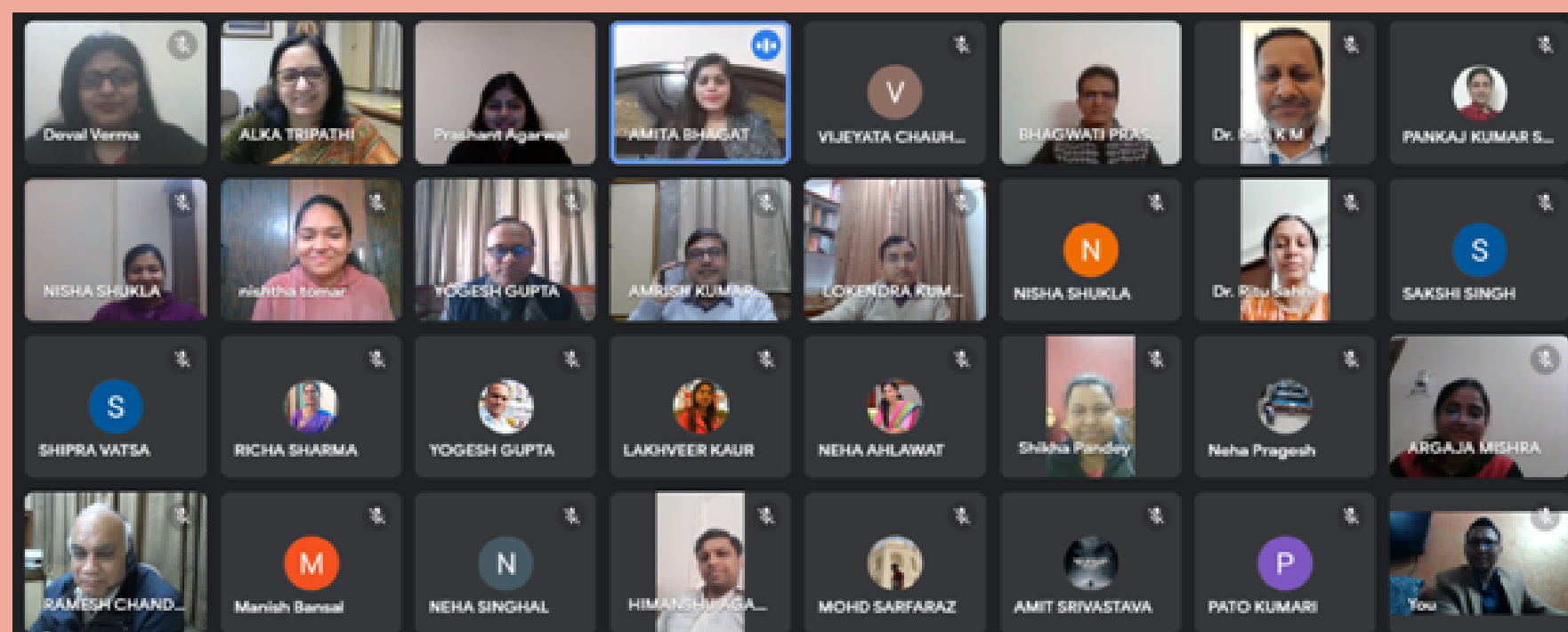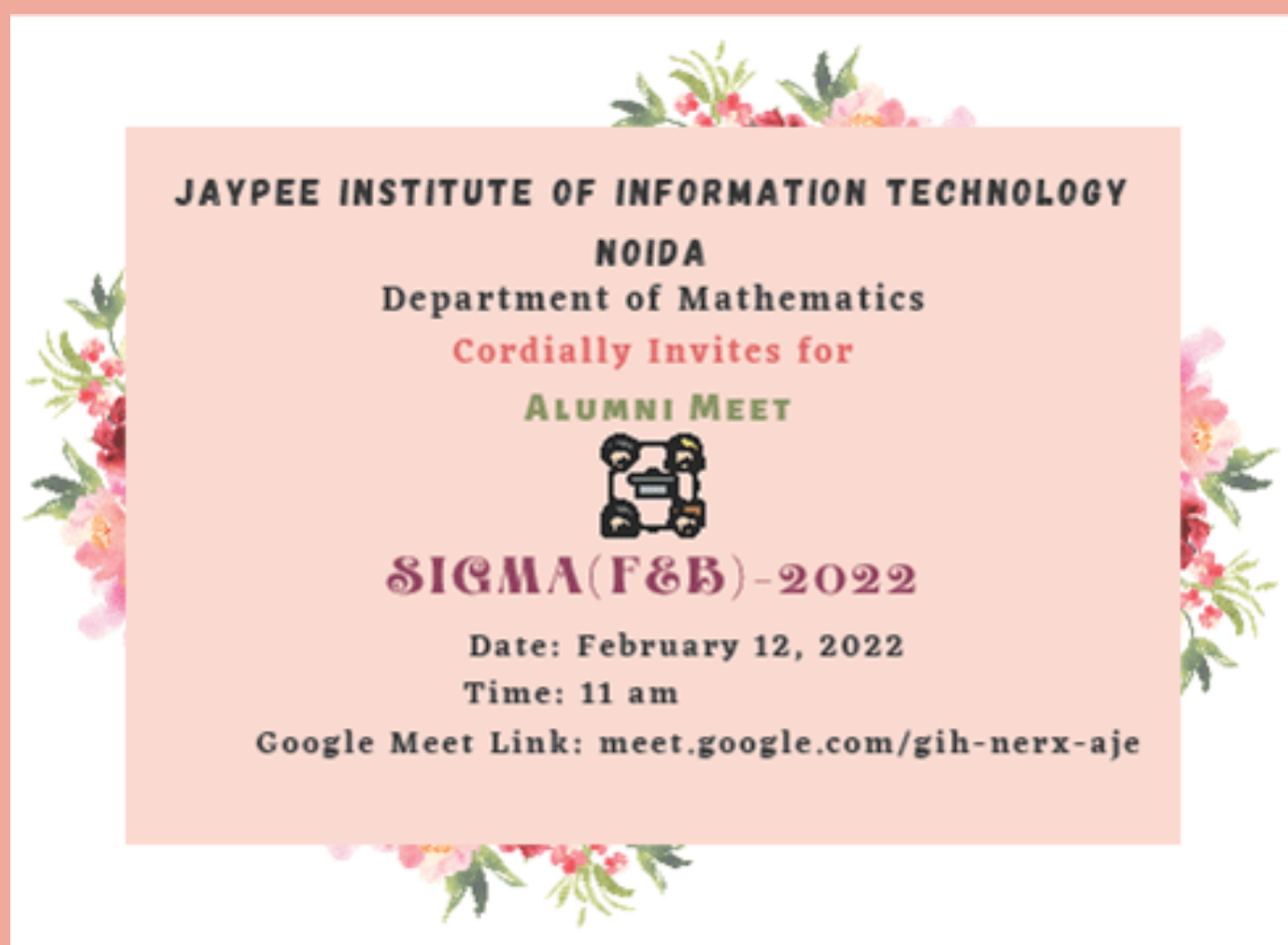
Organizers:
Dr. Dinesh C. Bisht
Dr. Amita Bhagat

The Teacher Enrichment Workshop (TEW) was organized by Department of Mathematics, JIIT Noida which was funded by the National Centre for Mathematics (A joint centre of TIFR & IIT Bombay). The TEW is meant for college teachers to revisit and update their content knowledge. The lectures in this workshop covered specific topics which are relevant for the teachers' classroom instructions. An important component of this programme was the discussion hour during which the teachers had opportunities to get their doubts cleared and work-out routine to advanced exercises. It is practically important for engineers and scientists to be able to model physical problems using differential equations, and then solve these equations so that the behaviour of the systems can be visualized in comprehensive manner. The primary focus of this TEW was to explore contemporary and advanced revolutions in multidimensional area of differential equations accompanied by mathematical modeling.
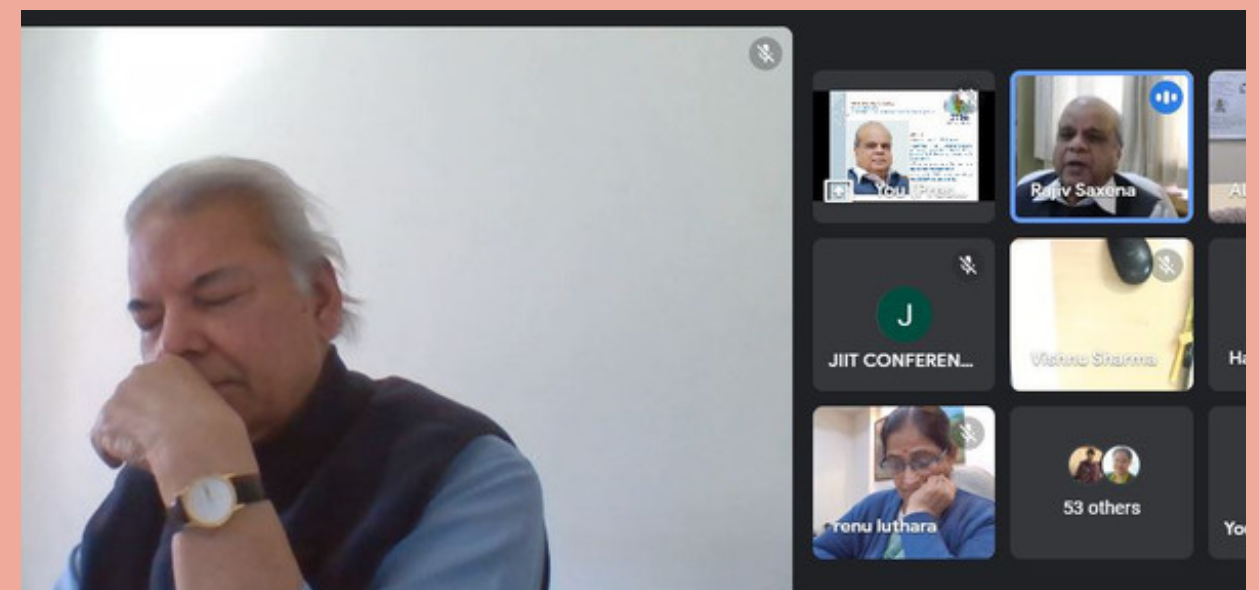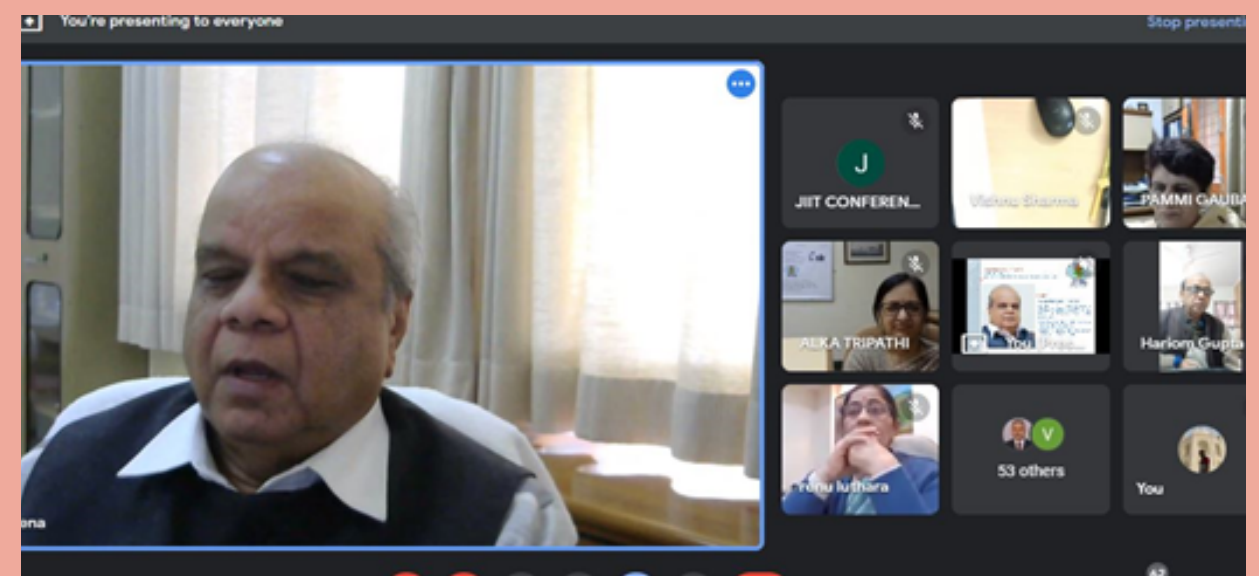
Organizers:
Dr. Amit Srivastava
Dr. Lakhveer Kaur
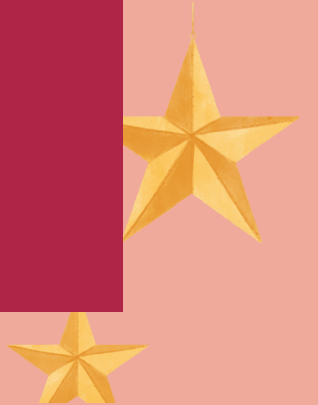
Expert Talk
" Scientific Research Paper Writing Ethics & Publication Opportunities"
March 10, 2022

An expert talk was organized on March 10, 2022 seeking valuable insights from Prof. Mangey Ram, Graphic Era University, Dehradun on Scientific Research Paper Writing, Ethics & Publication Opportunities. The idea was to stimulate young researchers, students and professionals for producing a quality research, project proposals with efficient ideology.
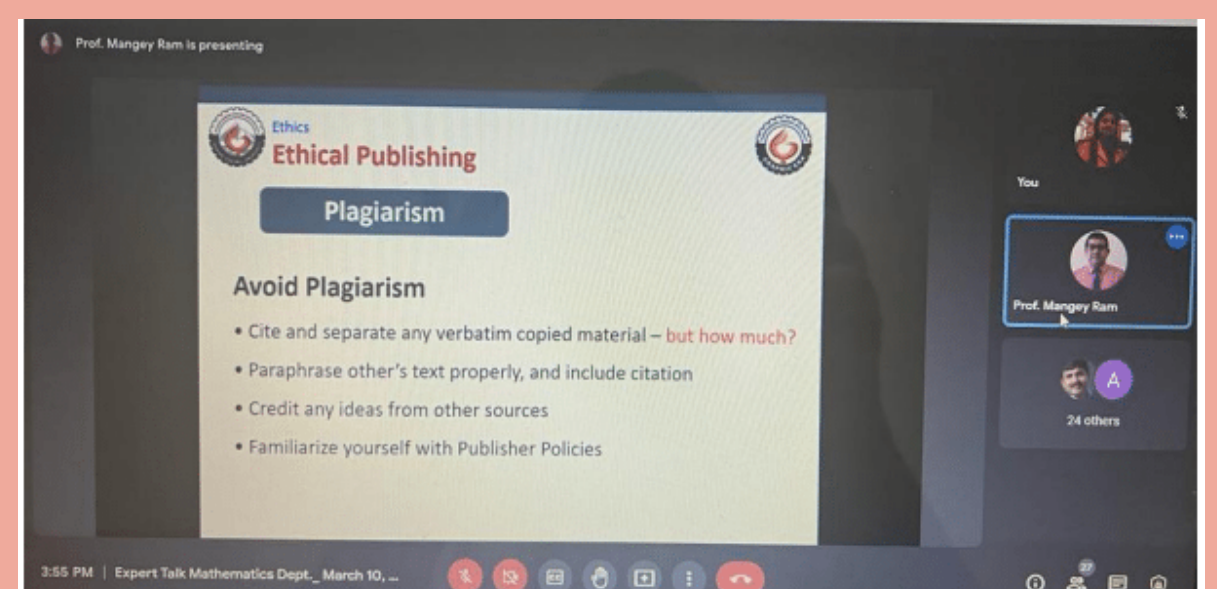
Organizer:
Dr. Lakhveer Kaur

Expert Talk
"Understanding Machine Learning with Linear Algebra and Optimization Perspectives"
May, 17, 2022
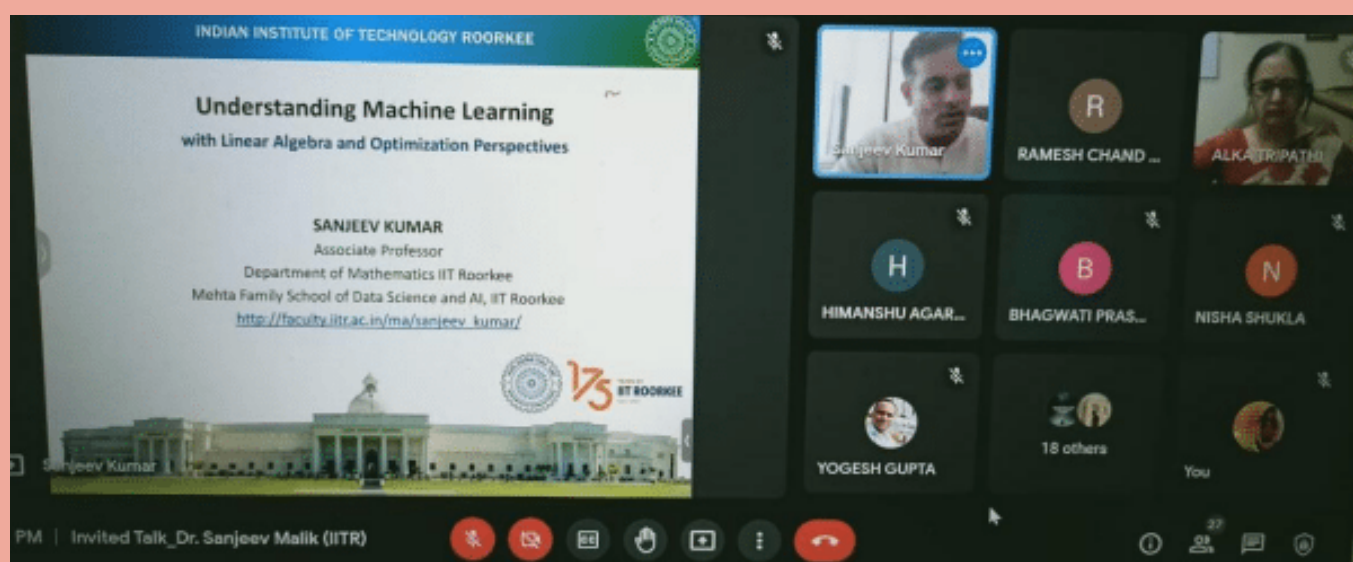
An expert talk was organized on understanding Machine Learning with Linear Algebra and Optimization perspectives on May 17, 2022 by inviting an expert Dr. Sanjeev Kumar Malik, IIT Roorkee. The objective behind this invited talk was to highlight the significance of machine learning and its insights to optimization and linear algebra.
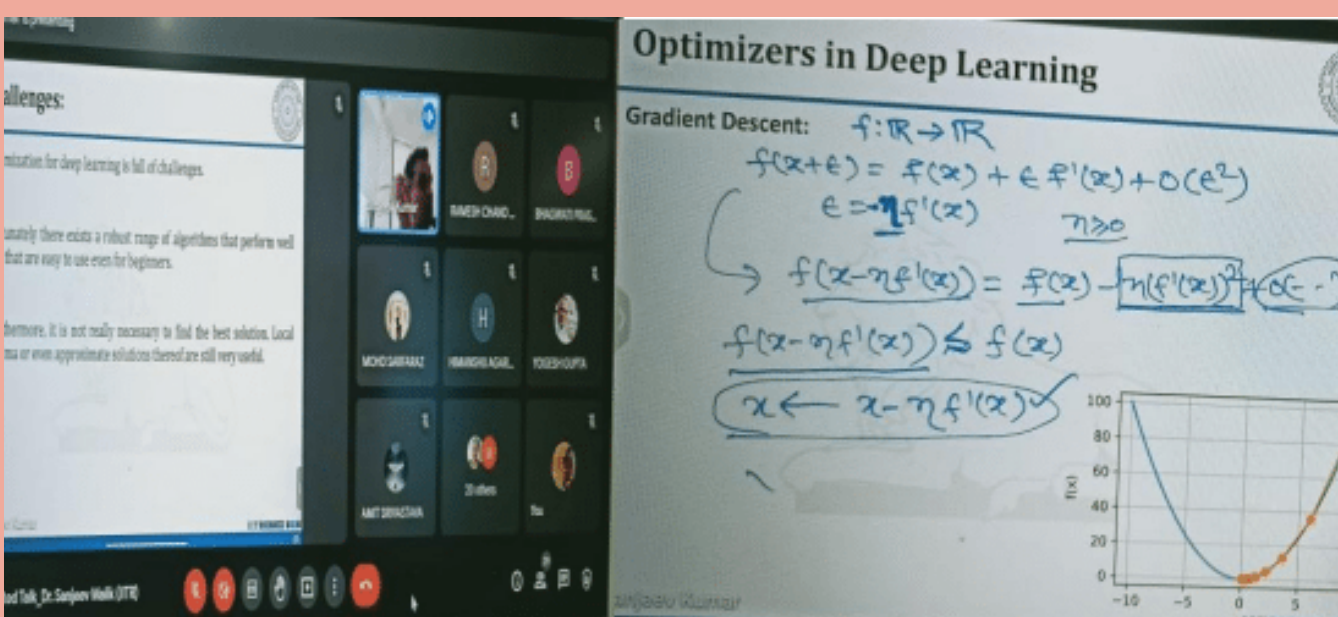
Organizers:
Dr. Amit Srivastava
Dr. Amita Bhagat
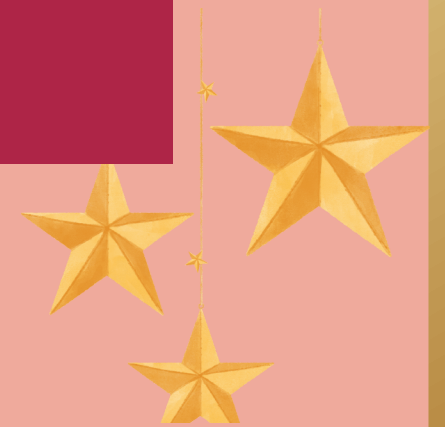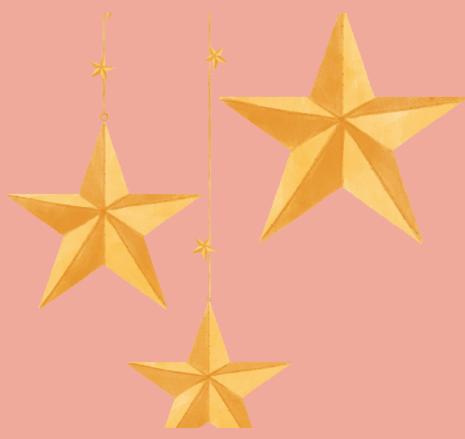
Upcoming Events

6th International Conference
"Recent Advances in Mathematical Sciences and its Applications (RAMSA-2022)
(December 08-10, 2022)
https://www.jiit.ac.in/jiit/ramsa/

6th International Conference

on

Recent Advances in Mathematical Sciences and its

Applications (RAMSA-2022)

(December 08-10, 2022)

Organized in blended mode (Online & Offline)

by

Department of Mathematics

Jaypee Institute of Information Technology

A-10, Sector-62, Noida, U.P.-201309, India

Website: www.jiit.ac.in/jiit/ramsa/

ABOUT JIIT

The Jaypee Institute of Information Technology (JIIT) is declared as a deemed to be University under section 3 of UGC Act 1956. JIIT is fully backed andsupportedby the Jaypee Group of Companies through its not-for-profit trust – Jaiprakash Sewa Sansthan (JSS). It is situated near the Electronic City at Noida and is at a distance of about 3 Kms from New Delhi – UP border. The state-of-the-art campus aims at becoming a centre of excellence in the field of information technology & related emerging areas of education, training and research comparable to the best in the World for producing professionals who shall be leaders in innovation, entrepreneurship, creativity and management. The Institute offers Doctoral (Ph. D), Post Graduate (M. Sc., M. Tech. and MBA) as well as Under Graduate (B. Tech., B.Sc.) programs in the various disciplines of Engineering, Sciences and Management. JIIT is a NAAC Accredited, AICTE approved and NIRF Ranked Institute in Delhi NCR.

ABOUT THE HOST DEPARTMENT

Mathematics plays a key role in the development of modern sciences, engineering, management and many other important areas of activities. With this aim in mind the Department of Mathematics was established from the very inception with a Vision to attain excellence in teaching and research and become a leader in the field of mathematics and its applications. Besides catering to the basic needs of the various B. Tech., M. Tech. and Ph. D. programs of the Institute, it had a strong fervor towards research and development. The Department has a good blend of pure and appliedmathematicians, which provides a vibrant research atmosphere. The specializations of the faculty members cover most of the important and emerging areas of Mathematics. The Department is also actively involved in its own research and development activities through its B.Sc., M.Sc. and Ph.D. Programs.

ABOUT THE CONFERENCE

The aim of this conference is to bring together learned mathematicians, scientists, engineers, researchers from industry and research scholars working in the different areas of mathematics at a common platform. The Conference provides an excellent opportunity to researchers, practitioners and educators to present and discuss the recent innovations in mathematics for potential implementation in sciences and engineering. It focuses on strengthening the existing results along with identifying the practical challenges encountered with respect to various solutions adopted in the fields of Mathematics and its Applications. Moreover, it will provide an opportunity to enhance collaboration among researchers not only from the various parts of the country but also with those from abroad. The scientific program will consist of Keynote/plenary/invited lectures and parallel sessions for contributed presentations. The main emphasis will be on the vibrant implicational aspects of applied mathematics for cultivating contemporary and advanced findings in multidimensional sphere of engineering and sciences. The invited lectures and refereed contributed papers will be published in the proceedings after due reviewing process by the committee of experts in various disciplines. The conference proceedings of the previous series of RAMSA were published by **AIP (Scopus Indexed), USA and Nova Publishers, USA.**

CALL FOR PAPERS

The broad topics of interest include, but are not limited to, the following:

- Algebra and Its Applications
- Analysis and Approximation Theory
- Coding, Cryptography and Information Theory
- Computational Fluid Dynamics
- Computer Graphics & Animation
- Continuum Mechanics and Vibrations
- Differential Equations and Applications
- Discrete Mathematical Structures
- Fixed Point Theory
- Fractals, Chaos and Dynamical Systems
- Fuzzy Mathematics and Logic
- Image Processing
- Numerical Analysis
- Optimization and Its Applications
- Probability, Statistics and Stochastic Processes
- Theory of Computation
- Wave Propagation
- Wavelets and Applications

IMPORTANT DEADLINES

Submission of Abstract	September 10, 2022
Acceptance of Abstract	September 14, 2022
Submission of Full Length Paper	October 05, 2022
Notification of Acceptance of Paper	October 25, 2022
Submission of Final Manuscript	November 5, 2022

COMMUNICATION

All the communications may be addressed to:
Prof. Alka Tripathi, (Conference Chair)
Head, Department of Mathematics
Dr. Yogesh Gupta, Dr. Lakhveer Kaur, (Conveners)
Department of Mathematics
Jaypee Institute of Information Technology
A-10, Sector-62, Noida- 201307, U.P., India
Mobile: +91 9953891505, +91 9899273989
Email: ramsaconference.jiit@gmail.com

Organizers:

- **Prof. Alka Tripathi, Head, Conference Chair**
- **Dr. Yogesh Gupta, Convenor**
- **Dr. Lakhveer Kaur, Convenor**
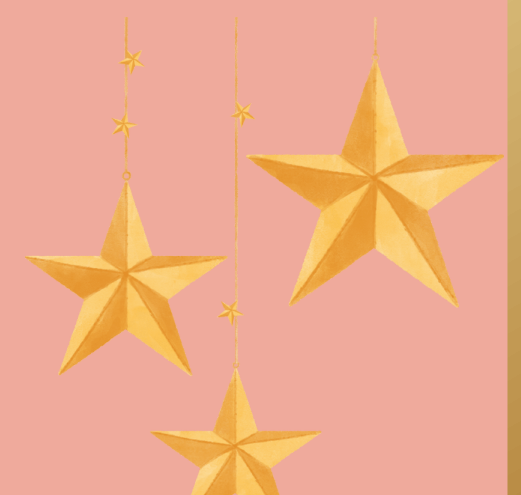
Project Sanctioned under
"Armament Research Board, DRDO, Delhi"

Principal Investigator (PI): Dr. Pato Kumari
Co-Principal Investigator (Co-PI): Prof. Alka Tripathi

Title : Seismic Scattering Modelling in Anisotropic Layered Media (SEISMAL)

Seismic Scattering Modelling in Anisotropic Layered Media (SEISMAL)

The project Seismic Scattering Modelling in Anisotropic Layered Media (SEISMAL) has been sanctioned under Grant-in aid scheme of Armament Research Board, DRDO, Delhi dated 8th June, 2022 to Dr. Pato Kumari as Principal Investigator (PI) and Prof. Alka Tripathi as Co-Principal Investigator (CO-PI) of Department of Mathematics, Jaypee Institute of Information Technology, Noida.

The principal focus of SESMAL is to develop realistic mathematical models to study reflection and refraction aspects of waves in layered anisotropic and composite media due to earthquake/artificial explosion in different geological structure. Complex layered structure of the Earth causes elastic waves generated during earthquake or artificial explosion, to behave as quasi-seismic rather than purely longitudinal or transverse. These waves play an important role to assess damage quantification for Shallow Buried Underground Structures (SBUS).
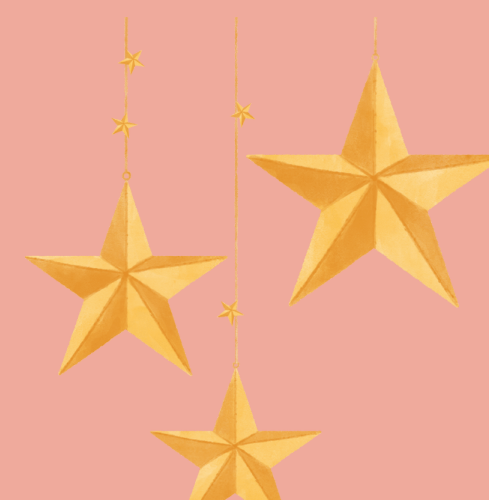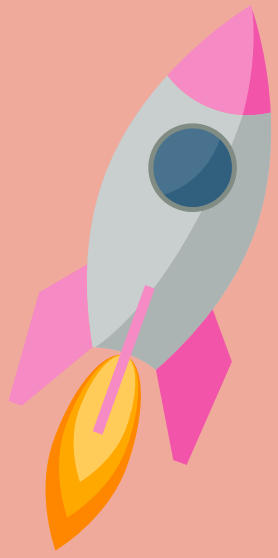
New Launch
Bachelor of Science (B. Sc.) Program

NEW

Jaypee Institute of Information Technology (JIIT) Noida
(A Deemed to be University under Section 3 of UGC Act 1956)

Admissions open for Session 2022-23
B.Sc. (Honours)
Computer Science, IT & Applications, Computing & Programming

Department of Mathematics

The Department of Mathematics is offering the following three Bachelors Programme in the ensuing academic year 2022-23:

B.Sc. (Honours) Computer Science

This programme is designed to develop analytical, computational thinking and problem-solving skills in design, development and implementation of computer software/hardware.

B.Sc. (Honours) Information Technology and Applications

This programme is designed to develop the skills and enrich the knowledge of current IT and tools & techniques for information management.

B.Sc. (Honours) Computing and Programming

This programme is designed to develop the knowledge and skills in computing as well as in programming to solve computational problems.

NOTE: Support will be provided in Teaching and Training by other departments like Computer Science and IT, ECE and Humanities, etc.

Duration: B.Sc. (Honours/ Honours with Research/Academic Projects/Entrepreneur) programmes of 3/4 years as per National Education Policy (NEP2020).

Why to Join B.Sc. at JIIT Noida?

- Highly Qualified and Experienced Faculty
- Curriculum Focused on Employability
- Choice Based Credit System
- Core and Elective Courses in Cutting Edge Areas
- State of the art Computer Laboratories
- Projects, Summer Training, Industry Internship, Dissertation
- 100% Placement of eligible students

Career Opportunities

- Software Engineer
- Data Scientist/ Data Analyst
- System Analyst/Business Analyst
- Web Developer/IT Consultant
- Network Administrator
- Startups/ Entrepreneur
- Excellent opportunities for Higher Studies

Tuition Fee

First Year: ₹ 100000
Second Year: ₹ 105000
Third Year: ₹ 110000
Fourth Year: ₹ 115000
*Other fee and charges as applicable

Eligibility Criteria

The candidate must have passed with minimum 50% marks in aggregate (45% for SC/ST candidates) in 10+2 or its equivalent examination from a single recognized board in science stream with mathematics as a compulsory subject.

Admission Procedure

Candidates fulfilling minimum eligibility criteria will be admitted to B. Sc. programmes on the basis of merit of Entrance Test UGET(JIIT)-2022 conducted by JIIT or CUET(UG) conducted by NTA. Candidate must appear in Physics, Chemistry & Mathematics in CUET(UG).

Syllabus of UGET(JIIT): Physics, Chemistry and Mathematics from Class XIIth NCERT syllabus.

Duration of UGET (JIIT): Two Hours.
No. of Questions: 30 MCQ from each Subject.

The date of applying Offline/Online has been extended.

Link to Apply Online
https://getadmissions.com/jaypee

Contact us

Prof. Alka Tripathi (HoD)
Mobile: 9711155009
Email: alka.choubey@jiit.ac.in

Prof. Amrish K. Aggarwal
(B.Sc. Program Coordinator)
Mobile: 9958335676
Email: amrish.aggarwali@jiit.ac.in

For more details visit
https://www.jiit.ac.in/bsc

Jaypee Institute of Information Technology, A-10, Sector-62, Noida-201309, U.P. India
Phone Numbers of Admission Cell: 0120 – 2594179/303/400, 7428630400/500/600/800
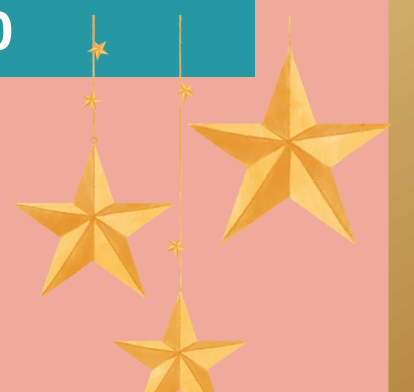
Bachelor of Science (B. Sc.) Program

Program Educational Objectives

PEO1: To provide theoretical and practical knowledge in the domains of Computer Science, Information Technology and Scientific Computing for leading successful career in industries, entrepreneurial endeavours or pursuing higher studies.

PEO2: To develop the ability to critically think, analyse and make decisions for offering commercially feasible and socially acceptable solutions to real life problems in the areas of Computer Science, Information Technology and Scientific Computing.

Program Outcomes

PO1: Computing Knowledge: Understand the basic principles and methods of computer science for solving complex computing problems.

PO2: Problem Analysis: Ability to analyse a problem, and identify and define the computing requirements appropriate to its solution.

PO3: Design and Development of Solution: To develop skills to design, implement, and document the solutions for computational problems.

PO4: Modern Tool Usage: Ability to use state of the art technologies for innovative software solutions.

PO5: Ethical and Societal Concern: Utilize the role of computing for solving real life problems, recognising ethical principles, commitment to professional ethics and its global impact on society at large.

PO6: Environment and Sustainability: Actively involved with knowledge, skills and right attitude in environmental context for sustainable development.

PO7: Individual and Team Work: Ability to work effectively as an individual or a team member or leader in a team to achieve a common goal.

PO8: Communication: Ability to communicate effectively through oral and written means.

PO9: Life-long learning: Ability to recognize the need of training and skills to engage in self-regulating and life-long learning.

Programme Specific Outcomes

B. Sc (Honours/ Honours with Research/Academic Projects/Entrepreneurship) Computer Science: To provide software and hardware solutions utilizing the principles of computer science.

B. Sc (Honours/ Honours with Research/Academic Projects/Entrepreneurship) Information Technology and Applications: To develop applications using current IT tools and technologies.

B. Sc (Honours/ Honours with Research/ Academic Projects/Entrepreneurship) Computing and Programming: To develop software solutions utilizing effective computing, architecture and efficient programming.

Expert Vichar Expert Ke Sath

Face to Face with
Prof. Alka Tripathi,
Head, Department of Mathematics

"If your actions inspire others to dream more, learn more, do more and become more, you are a leader."

We are honoured and feel privileged to have expert session with our leader Prof. Alka Tripathi Mam, regarding her journey, challenges and suggestions.

Q1. How do you describe your journey and experience of working with JIIT?

- I joined JIIT in 2001 as Senior Lecturer and had privilege of teaching the first batch of JIIT B.Tech students. Back then there were only two programs and two courses of Mathematics to teach. Over time, there was demand for more and more courses and now the department has expanded to more than 50 courses.

Q2. You joined here as a faculty and currently working as HOD of the Department. What challenges and responsibilities do you feel as HOD of the department?

- As HOD of the department, I have to see that all activities are running smoothly in the department, and to ensure that the policies of Institute are implemented in the Department. This is not only for the development of the Department but also for the growth of faculties and students. HOD has the responsibilities of the department in all respects. HOD is the bridge between Institute and Department.

Q3. What advice do you give to the students, especially post graduate students and research scholars so as to encourage them to handle the difficulties they face in studies ?

- They should always remember that whatever they are doing today will reflect on their career in future. They are competing not only with other JIIT peers but also with the world. So, whatever they are doing - be it study, project, research it is going to be compared with the outside world. Students should be sincere in their work. They should take guidance from their teachers and work hard in order to make their own identity as an individual.

Q4. Mam, you are actually a pillar to the department and source of motivation to all. How do you manage all the responsibilities, deadlines, teaching, research and health of course?

- I agree that I have to manage many responsibilities at a time and sometimes it is very difficult to manage. I try to prioritise based on importance and deadlines in mind. I have to ensure the completion of my tasks on a daily basis. If I am not able to complete my work, I tackle the most important work first. Though I am HOD, I am a teacher first, so I always keep time aside for teaching and research separately.

Q5. Our faculty members are keenly waiting for the tips and suggestions that can help them in keep going with the duties and assignments. What suggestions you can provide mam?

- From my experience I have learned that whatever you do, either any duty or assignment or teaching/ research it should be with sincerity and within time. Always value time and your work. Whatever you are doing if you are doing with sincerity it will be recognized one day.

" Thanks a lot for your time and words mam."
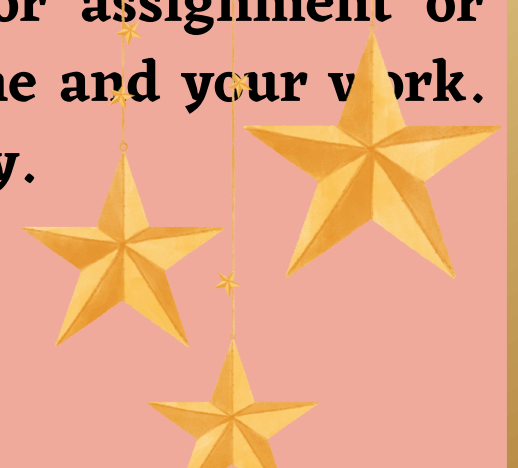
Research Publications

| Journal Publications |
|---|
| 1. U. K. Sharma, G.Varshney, V. C. Dubey, A. H. Ziaie, and H. Moradpour. "Kaniadakis holographic dark energy in nonflat universe." International Journal of Modern Physics D, vol 31, no. 03, pp. 2250013 January 2022. |
| 2. S. Upadhyay, and V. C. Dubey. "Reconstructing scalar field models of the Sharma–Mittal holographic dark energy." Modern Physics Letters A, vol 37, no. 01, pp. 2250004 January 2022. |
| 3. L. Kaur, A. M. Wazwaz, "Dynamical analysis of soliton solutions for space-time fractional Calogero-Degasperis and Sharma-Tasso-Olver equations", Romanian Reports in Physics, Vol. 74, pp. 108 (1-17), 2022. |
| 4. R. Goel, R.C. Mittal and N. Ahlawat, "Numerical Simulation of Oncolytic M1 Cancer Virotherapy Reaction-Diffusion Model by Collocation of B-Splines" Turkish Journal of Computer and Mathematics Education, vol. 13(2), pp.451-474, 2022. |
| 5. S.K. Rai, N. Ahlawat, R. Upadhyay, P. Kumar, and V. Panwar, " A Study on the Effect of Geometry and Operating Variables on Density Wave Oscillation in a Supercritical Natural Circulation Loop" Computation, Vol. 10(2), pp.25, 2022. |
| 6. P. Kumari, S. K. Tomar and V.K.Sharma, "Dynamical behaviour of torsional waves in a layered composite structure with sliding contact", Arabian Journal of Geosciences, vol. 15, no. 546 , pp. 1-11, 2022. |
| 7. R. Saini, N. Ahlawat, P. Rai and M.A. Khadimallah, "Thermal stability analysis of functionally graded non-uniform asymmetric circular and annular nano discs: Size-dependent regularity and boundary conditions", European Journal of Mechanics-A/Solids, vol. 94, pp.104607, 2022. |
| 8. S. Chaudhary, A. Bhardwaj, P. Rana, "Image enhancement by linear regression algorithm and sub-histogram equalization", Multimedia Tools and Applications, vol. 81, pp. 29919–29938, 2022. |
| 9. R. Rohila and R. C. Mittal, " Analysis of chaotic behavior of three-dimensional dynamical systems by a -spline differential quadrature algorithm", Asian-European Journal of Mathematics,World Scientific Publishing Company , vol. 15(4), pp2250077 , 2022. |
| 10. R. C. Mittal, S. Kumar and R. Jiwari, "A cubic B-spline quasi-interpolation algorithm to capture the pattern formation of coupled reaction-diffusion models" Engineering with Computers, Springer London, vol 38(2), pp. 1375-1391, 2022. |

Research Publications

11.	M. K. Bansal, K. S. Nisar, J. Choi, and D. Kumar, "Generalized fractional operators and their image formulas" Journal of Computational Analysis and Applications, Vol. 30(2), pp. 222-235, 2022.
12.	N. Jolly, M.K. Bansal, , "Several inequalities involving the generalized multi-index Mittag-Leffler functions" Palestine Journal of Mathematics, Vol. 11(2), pp. 290–298, 2022.
Conference Proceedings	
1.	B P Chamola, R Sahni and M Sahni, "Generalized KKM Mapping Theorems", Advances in Intelligent Systems and Computing, vol 1405, pp. 77-91, 2022.
2.	R. Goel, R. C. Mittal and N. Ahlawat, "An efficient numerical approach to simulate NPZ and SIR biological models with diffusion" In Journal of Physics: Conference Series. IOP Publishing, vol. 2267, no. 1, pp. 012135, 2022.
Books Published	
1.	J. K. Katiyar, V. Panwar and N. Ahlawat, "Nanomaterials for Advanced Technologies", Springer, Singapore, 2022.
2.	B. P. Chamola, P. Kumari and L. Kaur, Emerging Advancements in Mathematical Sciences. Nova Science Publisher, USA, 2022, ISBN: 978-1-68507-711-2.
Book Chapters	
1.	N. Ahlawat, S.K. Rai and M.K. Gupta, "Prospects Toward the Development of Nanomaterials for Advanced Applications", In Nanomaterials for Advanced Technologies, Springer, Singapore pp. 195-197, 2022.
2.	A. P. Singh and A. Bhagat, N-Policy for Finite Queueing Models with Unreliable Server and Working Vacation, In Emerging Advancements in Mathematical Sciences, Nova Science Publisher, pp. 155-170, 2022.
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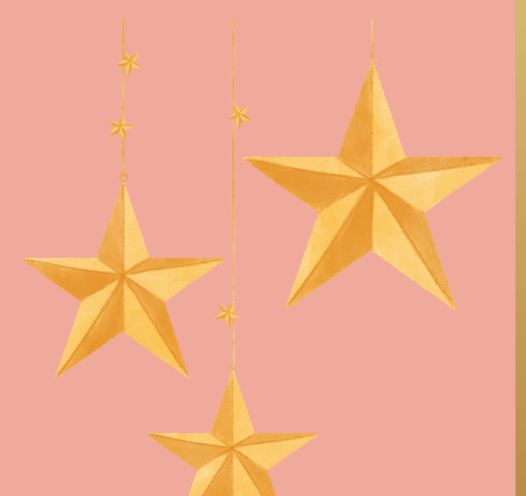
Penned by Faculty Members

From My Diary...
-Prof. R. C. Mittal

Here are 10 interesting questions. Let us see how many of them you can solve?
Solutions will be given in the next issue.

1. How many zeros are there at the end of 105!

2. Show that $\pi < \frac{22}{7}$.

3. Show that sin 10° is irrational.

4. If a $n x n$ matrix A is defined by $a_{ij} = \begin{cases} 1, & i+j = n+10 \\ 0, & otherwise \end{cases}$. Find its eigen-values.

5. Find the maximum points of the function, $f(x) = \int_0^x (x-2)(x-3)(x-4)dx$.

6. Find the function $f(x) = x^3 + f'(1)x^2 + f'(2)x + f'(3)$.

7. Find the area of the region consisting of all points (x, y) such that

   $|x| + |y| + |x + y| \leq 4$.

8. Find the remainder when 2^{100} is divided by 7.

9. Find real a, such that the equation $x^3 - 3x^2 + a = 0$ has distinct real solutions.

10. What are the last two digits in $8! + 9! + ... + 2021!$

NEGATION – A CRITICAL REVIEW
-Dr. Amit Srivastava

Negation has been an integral part of communication since ancient times. Negation basically refers to the contradiction or denial of anything. In classical logic, negation of any proposition is true when the proposition is false and vice versa. It is an operation that requires only one operand. In general, negation connects any proposition P to any other proposition ~P with an interpretation that in some manner opposes the meaning of P. Consider the statement "The number 9 is ODD", then its negation can be written as "The number 9 is not ODD". But if the statement reads" Tina gave a bath to her daughter wearing a pink shirt", then writing its negation is slightly

difficult since we don't know who is wearing the pink shirt (Tina or her daughter).
The following table summarizes some commonly used statements involving propositions P and Q and their negations.
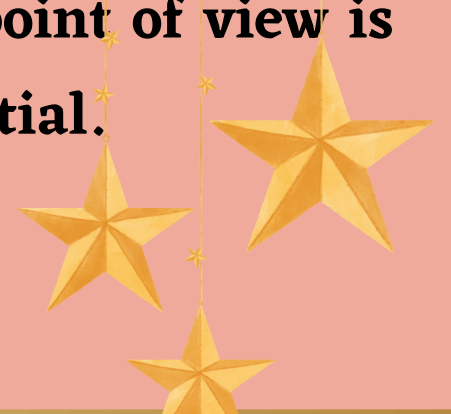
S. No.	Statement	Negation	Examples
1.	P or Q	Not P and Not Q	Statement: You are either poor or careless. Negation: You are not poor and not careless.
2.	P and Q	Not P or Not Q	Statement: I am both poor and careless. Negation: I am not poor or I am not careless.
3.	If P THEN Q	P and Not Q	Statement: If I am poor then I am careless. Negation: I am poor and I am not happy.
4.	$\forall x\, P(x)$	$\exists \neg x\, P(x)$	Statement: Every student spends more than ten hours every week in classes. Negation: There exists a student who does not spend more than ten hours every week in classes.
5.	$\exists x\, P(x)$	$\forall \neg x\, P(x)$	Statement: There exists a student who spends more than ten hours every week in classes. Negation: No student spends more than ten hours every week in classes.

Also in classical logic, the negation of negation of a proposition P to logically equivalent to the proposition P. However, in intuitionistic logic, a proposition infers a double negation but the converse is not true. We can define the concept of negation in fuzzy domain also. For propositions which have logical values described by fuzzy sets, we can either negate the proposition itself or we can negate the truth value of the proposition. But in this case the negations obtained will not be identical. We consider the statement P: Virat is a good football player represented by the fuzzy set as A = {(1,0.63);(5,0.35);(9,0.11)}. Then negating the proposition yields ~A*={(0,0.63);(-4,0.35);(-8,0.11)} and negating the truth value yields ~A={(1,0.37);(5,0.65);(9,0.89). Obviously the sets ~A* and ~A are not identical but both of them exhibit some opposition as far as fuzzy set A is concerned. Similarly we can define negation in other frameworks. It is clear from the above examples that negation basically refers to the opposition of anything. The next question which arises whether we can control the opposition we are applying/facing in any domain. The answer is Yes, but over the years building a mathematical framework for it has been very difficult for mathematicians and researchers. One way in which we can control the degree of opposition is by defining the concept of PARTIAL NEGATION. Partial Negation signifies that we do not want to oppose anything(certain/uncertain) fully, we may want to oppose only a part of it.
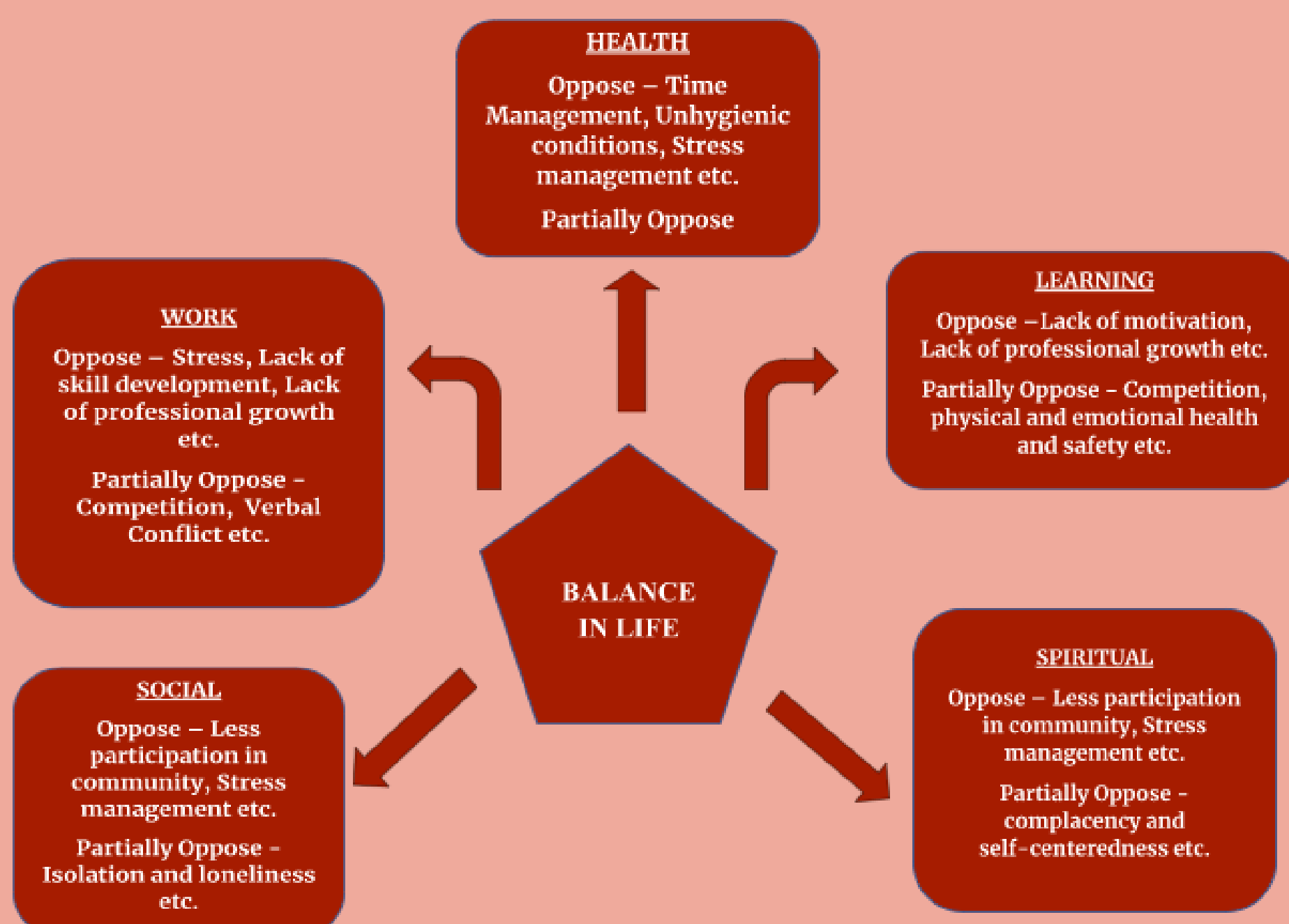
The following diagram indicates the various factors essential for living a balanced life and what we need to oppose/partially oppose for maintaining the balance. It is clear that better understanding of underlying structure of negation from the mathematical and application point of view is utmost essential.

HEALTH
Oppose – Time Management, Unhygienic conditions, Stress management etc.
Partially Oppose

WORK
Oppose – Stress, Lack of skill development, Lack of professional growth etc.
Partially Oppose – Competition, Verbal Conflict etc.

LEARNING
Oppose –Lack of motivation, Lack of professional growth etc.
Partially Oppose – Competition, physical and emotional health and safety etc.

BALANCE IN LIFE

SOCIAL
Oppose – Less participation in community, Stress management etc.
Partially Oppose - Isolation and loneliness etc.

SPIRITUAL
Oppose – Less participation in community, Stress management etc.
Partially Oppose - complacency and self-centeredness etc.

Role of Mathematics in Battle against the Spread of Epidemics
-Dr. Yogesh Gupta

Mathematics, contrary to common assumption, may be a valuable tool in the fight against epidemics. We'll look at some of the first mathematical models of disease transmission, as well as more current ones that use computer simulations and take into account a variety of variables. The knowledge gathered from such techniques can be utilised to help policymakers make judgments about new disorders like novel coronavirus disease.

The World Health Organization (WHO) had announced emergency counter-measures to stop the spread of the Covid-19, which became a worldwide health danger since March 2020. Have you ever thought about how professionals obtain information that allows them to make timely decisions? Or how do they calculate the amount of persons who may become infected? How do experts envision the infection's spread and ability to transcend borders? Lockdown orders are made based on what conclusions? Finally, how can scientists forecast the length of an epidemic?

The solution is found in Mathematics. Mathematical functions can be utilised to model the dynamics of infectious disease transmission among humans. Mathematical modelling creates a visual depiction of the disease's dynamics, which can be expressed using various tools such as graphs, charts, and comparison tables.

Models are useful for visualising how illnesses impact people. As a result, epidemiologists — public health professionals — rely on them heavily to assess risk and analyse intervention plans for disease control and prevention. Model-based insights help with disease management protocols such as mass vaccination efforts, treatment patterns, and preventive measures.

Mathematical models have a century of history behind them. William O. Kermack and A. G. McKendrick ("Kermack WO, McKendrick AG. Contributions to the mathematical theory of epidemics--I. 1927. Bulletin of Mathematical Biology. 1991;53(1-2):33-55. DOI: 10.1007/bf02464423. PMID: 2059741.") discovered that a population exposed to an illness may be separated into three categories: Susceptible, Infected, and Recovered. They devised a mathematical representation for the numbers in each of these groupings.

They turned their concept into differential equations, which show how a physical quantity and its rate of change are related. Starting from an initial condition in which one infectious person seeds the illness among the others, the Kermack-McKendrick equation calculates what proportion of the population falls into one of these groups over time.
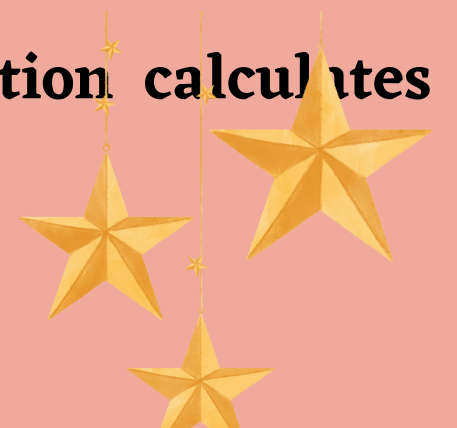
Kermack and McKendrick developed their classic SIR (Susceptible-Infected-Recovered) model to forecast disease transmission as a result of this. Since then, mathematical models have been increasingly important in the transformation of public health care. To cope with the inundation of challenges that result from medical disorders, governments, health organisations, scientists, and hospitals rely significantly on models.

The infection's transmissibility from the infected to the uninfected is governed by a number of variables. The infection can be disseminated by direct touch, water, air, or surfaces that harbor the pathogen. Furthermore, disease dynamics may be investigated at several dimensions, including the individual, small groups of people, and large populations. Various models are used based on the intricacy of the data. Computers simulate models in their current incarnation, generating infection numbers and dispersion patterns.

People fall into one of three 'compartments' in the SIR model: Susceptible, Infected, or Recovered. The equations that describe them presume that the Infected may interact with Susceptibles, infecting and transforming them to Infected. The Susceptible decreases as the number of Infected rises. People who have been infected can also recover and are allocated to the Recovered compartment.

These equations may then be solved to see how the number of persons infected fluctuates over time. Additional categories are occasionally added to the basic model. An individual who is infected but has no symptoms, for example, might be classified as a new category. Additional criteria, such as age, must occasionally be taken into account.

However, reality has many more layers of intricacy. People mingle and socialise at random, which has a significant impact on disease transmission. Important features such as illness progression, a person's level of susceptibility, and demographic characteristics are left out of the basic model, necessitating the development of more complete models.

In the context of the current coronavirus outbreak, such rigorous techniques for estimating variables and characteristics intrinsic to an epidemic proved useful. Several models have evolved, revealing the pathogen's transmissibility and destructive behaviours. These models can assist in quantifying the quarantine and social distancing measures, as well as determine the estimated number of cases and how rapidly the disease will spread. They help health-care organisations pay for medical equipment and facilities such as ICU beds and ventilators, allowing for faster policymaking.
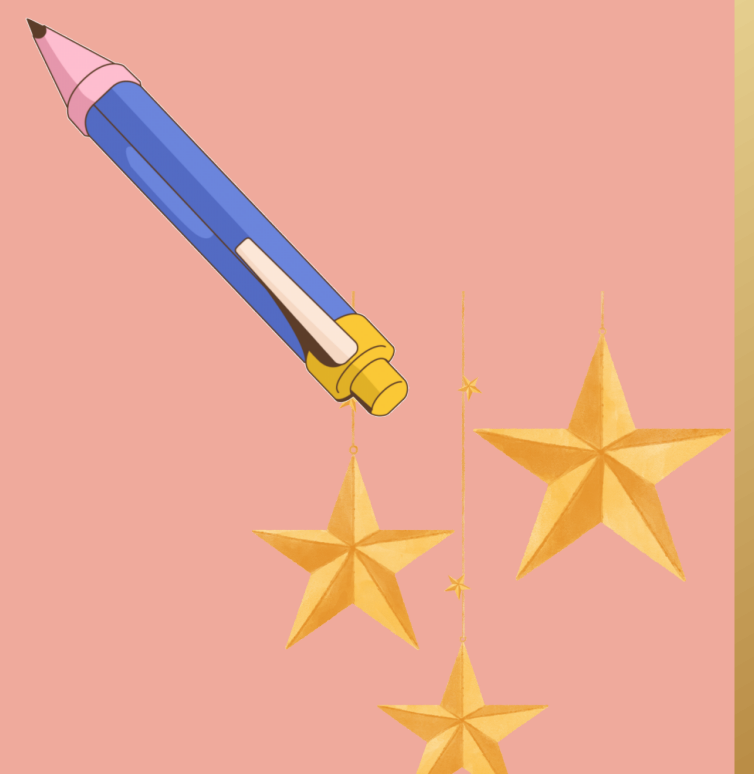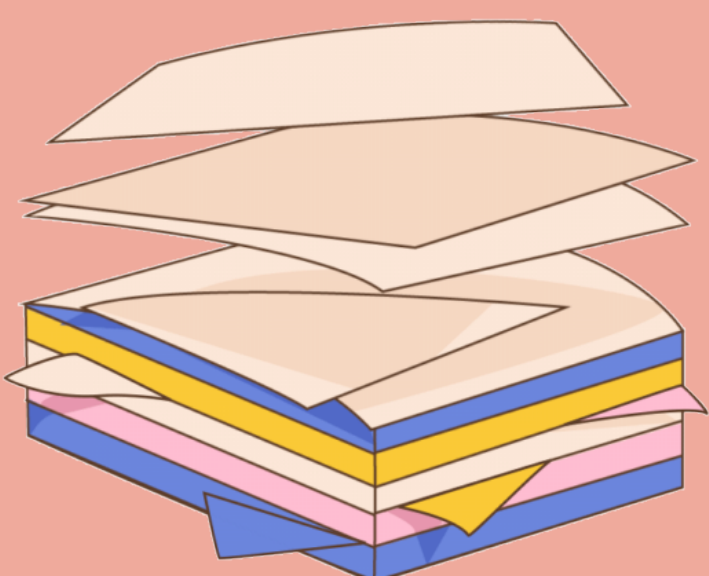
Practice Gratitude Every Moment

"Gratitude turns what we have into enough, and more. It turns denial into acceptance, chaos into order, confusion into clarity...it makes sense of our past, brings peace for today, and creates a vision for tomorrow."
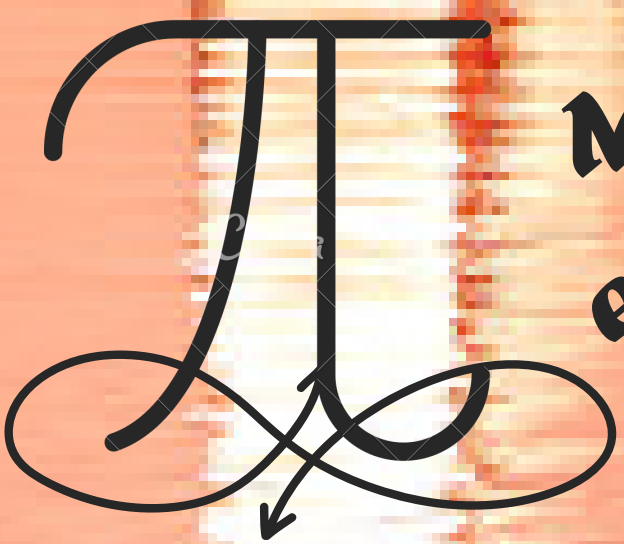
Mathematics is not only about numbers, equations, computations, or algorithms: it is about understanding.

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