Dr. SHIKHA MITTAL
Assistant Professor, Department of Mathematics
 Email id: shikha@jmc.du.ac.in

Qualifications:
- Ph.D. (Mathematics) from Jamia Millia Islamia in 2017
- M.Sc. (Mathematics) from Kirorimal College, University of Delhi in 2014
- B.Sc .(H) (Mathematics) from Kirorimal College, University of Delhi in 2012

Research Interest: Chaos Control, Chaos Synchronization, Nonlinear Dynamical Systems, Fractional Order.

Papers Taught: Linear Algebra, Differential Equations, Partial Differential Equations, Calculus, Statistics, Latex and HTML, Computer Algebra Systems and Related Softwares, Numerical Methods, Mathematical Finance.

College Societies:

- Green Society (2018-19)
- Add-on-Courses Committee (2019-22)
- Hindi Debating Society (2019-20)
- NAAC Criterion 6 (2019-21)
- NAAC Criterion 7 (2018-21)
- NAAC Core Team (2018-21)
- Golden Jubilee School Project (2019-21)
- Webinar Committee (2019-20)
- Remedial Coaching Classes
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Workshops/ FDP/ Paper Presentations

1. Participation in "International Conference on Algebra, Geometry, Analysis and their Applications (ICAGAA-14)" held in Jamia Millia Islamia, during November 27-29, 2014.
2. Paper presentation entitled "Generalized Increased and Reduced Order Synchronization between 5D and 6D Hyperchaotic Systems" in International Conference on The Occasion of Silver Jubilee of the Indian Society of Industrial and Applied Mathematics (ISIAM) (2016) held at Sharada University, Noida, India during 29-31 January, 2016.
3. Participation in advanced level workshop on Variational Inequality (VI) and Applications under the auspices of National Program on Differential Equations: Theory, Computation and Applications (NPDE-TCA) sponsored by DST, Govt. of India held at Sharada University, Noida, India during January 24-28, 2016.

4. Participation in the workshop on LATEX and HTML organized by department ofmathematics, ANDC (University of Delhi) on 27th August, 2016.

5. Paper presentation entitled "Synchronization between a Novel Integer-Order Hyperchaotic System and a Fractional –Order Hyperchaotic System using Tracking Control" in International Conference on Differential Geometry, Algebra and Analysis held in Jamia Millia Islamia, during November 15-17, 2016.

6. Delivered a talk entitled "*Dynamical Properties of a Hyperchaotic Nonlinear Dynamical System with No Equilibrium Point*" in "Dynamics Day Delhi-2016" during December 14th at Cluster Innovation Centre (CIC).

7. Participation in two days FDP on 'Emerging Research Methodologies in Social Sciences' organized by IQAC and research committee, Jesus and Mary College on 3rd and 4th May, 2018.

8. Paper presentation entitled "Combination-Combination Synchronization of Fractional Order Hyperchaotic Systems" in The Conference on Nonlinear Systems and Dynamics organized at Jawaharlal Nehru University during 11-14 October, 2018.

9. Participation in FDP cum workshop on Climate across the curriculum: educational resources for teachers held at Jesus and Mary College on 28 January, 2019.

10. Paper presentation entitled "Multi-switching Synchronization of Chaotic Systems via Sliding Mode Control" in The National Conference on Advances in Mathematical Analysis and Its Applications organized at PGDAV college during 8-10 November, 2019.

11. Paper Training Workshop on "Tableau Desktop I: Fundamentals Training" held on 27/01/2020 to 28/01/2020 organized by Tableau Software, Global Service at JMC.

12. FDP on "Reimaging Academics Leadership "Redefining the role of Teacher and Academic Excellence in the era of Disruption" by Maj. Gen. G.G Dwivedi held on 16/12/2019.

13. Participated in online 5 Days R Training Workshop held on 11 May, 2020 to 15 May 2020.

14. Participated in online 4 Days National Level Webinar on Revised NAAC Assessment and Accreditation: Nurturing Quality Culture held on 8 May, 2020 to 11 May, 2020 organizedby IQAC Cluster India.

15. Participated in webinar on "Graph Theory & Petri Nets Applications" held on 1 May, 2020 organized by SPM College for Women, DU.

16. Participated in webinar on "Migration Matters" held on 15 May, 2020 organized by JMC, DU.
17. Participated in online TWO-WEEK REFRESHER COURSE IN "MATHEMATICS" organized by "Department of Mathematics, Ramanujan College" held on 16/03/2021 to 30/03/2021.
18. Participated in FDP on "Online teaching Tools" organized by JMC, University of Delhi held on 24-07-2020 to 25-07- 2020.

Guided Internships:

1. Guided three-month long internship (from 1/08/2020 to 5/11/2020) to Ms. Devika Khurana a student of M.Sc. Mathematics program, IIT Roorkee on the Topic "Fundamental Dynamical Properties of Chaos" under my supervision at the Department of Mathematics, Jesus and Mary College, University of Delhi, Chanakyapuri, New Delhi.
2. Guided three-month long internship (from 1/08/2020 to 5/11/2020) to Ms. Kanishka Goyal a student of M.Sc. Mathematics program, Banaras Hindu University on the Topic "Study of Dynamical Behavior of Chaotic and Hyperchaotic Systems" under my supervision at the Department of Mathematics, Jesus and Mary College, University of Delhi, Chanakyapuri, New Delhi.

Software Skills

- MS OFFICE
- MATLAB
- MATHEMATICA
- LATEX
- R
- EXCEL
- C++

Publications

2021

1. Vaidyanathan, Sundarapandian, Aceng Sambas, Ahmad Taher Azar, and Shikha Singh. "A new multistable plasma torch chaotic jerk system, its dynamical analysis, active backstepping control, and circuit design." In *Backstepping Control of Nonlinear Dynamical Systems*, pp. 191-214. Academic Press, 2021.

2. Azar, A. T., Serrano, F. E., Flores, M. A., Kamal, N. A., Ibraheem, I. K., Humaidi, A. J., ... & Mittal, S. (2021). Dynamic self-recurrent wavelet neural network for solar

irradiation forecasting. In *Design, Analysis, and Applications of Renewable Energy Systems* (pp. 249-274). Academic Press, 2021.

3. Azar, A. T., Serrano, F. E., Flores, M. A., Kamal, N. A., Ruiz, F., Ibraheem, I. K., ... & Mittal, S. (2021). Fractional-order controller design and implementation for maximum power point tracking in photovoltaic panels. In *Renewable Energy Systems* (pp. 255-277). Academic Press, 2021.

4. Fekik, A., Azar, A.T., Denoun, H., Kamal, N.A., Bahgaat, N.K., Gorripotu, T.S., Pilla, R., Serrano, F.E., Mittal, S., Rana, K.P.S. and Kumar, V., 2021. Improvement of fuel cell MPPT performance with a fuzzy logic controller. In *Renewable Energy Systems* (pp. 161-181). Academic Press, 2021.

2020

1. Singh, Shikha, et al. "Multi-switching synchronization of nonlinear hyperchaotic systems via backstepping control." *Backstepping Control of Nonlinear Dynamical Systems*. Academic Press, 2021. 425-447.

2. Singh, Shikha, and Ahmad Taher Azar. "Multi-switching combination synchronization of fractional order chaotic systems." *Joint European-US Workshop on Applications of Invariance in Computer Vision*. Springer, Cham, 2020.

3. Mittal, Shikha, Ahmad Taher Azar, and Nashwa Ahmad Kamal. "Nonlinear Fractional Order System Synchronization via Combination-Combination Multi-switching." *International Conference on Advanced Intelligent Systems and Informatics*. Springer, Cham, 2020.

2019

1. Khan, Ayub, and Shikha. "Robust adaptive sliding mode control technique for combination synchronization of non-identical time delay chaotic systems." *InternationalJournal of Modelling, Identification and Control* 31.3 (2019): 268-277.

2. Khan, Ayub, Shikha, and Ahmad Taher Azar. "Combination-Combination Anti-Synchronization of Four Fractional Order Identical Hyperchaotic Systems." *International Conference on Advanced Machine Learning Technologies and Applications*. Springer, Cham, 2019.

3. Bhat, Muzaffar Ahmad, and Shikha. "Complete synchronization of non-identical fractional order hyperchaotic systems using active control." *International Journal of Automation and Control* 13.2 (2019): 140-157.

4. Sundarapandian Vaidyanathan, Sambas Aceng, Zhang S., Ahmad Taher Azar, Shikha. "A plasma-torch chaotic oscillator, its analysis, backstepping control and circuit simulation." Backstepping Control of Nonlinear Dynamical Systems. (2019).

5. Singh, Shikha, and Ahmad Taher Azar. "Controlling chaotic system via optimal control." *International Conference on Advanced Intelligent Systems and Informatics*. Springer, Cham, 2019.

2018

1. Ouannas, Adel, Giuseppe Grassi, Ahmad Taher Azar, and Shikha. "New Control Schemes for Fractional Chaos Synchronization." In *International Conference on Advanced Intelligent Systems and Informatics*, pp. 52-63. Springer, Cham, 2018.

2. Khan, A., Shikha., Azar, A. T., & Zhu, Q. (2018, July). Synchronization Between a Novel Integer-Order Hyperchaotic System and a Fractional-Order Hyperchaotic System Using Tracking Control. In *2018 10th International Conference on Modelling, Identification and Control (ICMIC)* (pp. 1-8). IEEE.

3. Khan, Ayub, and Shikha. "Generalization of combination-combination synchronization of n-dimensional time-delay chaotic system via robust adaptive sliding mode control." *Mathematical Methods in the Applied Sciences* 41.9 (2018): 3356-3369.

4. Shikha, et al. "Active Control for Multi-Switching Combination Synchronization of Non-Identical Chaotic Systems." *Advances in System Dynamics and Control*. IGI Global, 2018. 129-162.

5. Shikha, et al. "Multiswitching Synchronization of Commensurate Fractional Order Hyperchaotic Systems Via Active Control." *Mathematical Techniques of Fractional Order Systems*. 2018. 319-345.

6. Shikha, Ahmad Taher Azar, and Quanmin Zhu. "Multi-switching Master–Slave Synchronization of Non-identical Chaotic Systems." *Innovative Techniques and Applications of Modelling, Identification and Control*. Springer, Singapore, 2018. 321-330.

7. Vaidyanathan, S., Azar, A. T., Sambas, A., Shikha., Alain, K. S. T., & Serrano, F. E. (2018). A novel hyperchaotic system with adaptive control, synchronization, and circuit simulation. In *Advances in System Dynamics and Control* (pp. 382-419). IGI Global.

2017

1. Khan, Ayub and Shikha. "Chaotic analysis and combination-combination synchronization of a novel hyperchaotic system without any equilibria." *Chinese Journal of Physics* 56.1 (2018): 238-251.

2. Azar, Ahmad Taher, Adel Ouannas, and Shikha. "Control of new type of fractional chaos synchronization." *International Conference on Advanced Intelligent Systems and Informatics*. Springer, Cham, 2017.

3. Shikha, et al. "Sliding mode control technique for multi-switching synchronization of chaotic systems." *2017 9th International Conference on Modelling, Identification and Control (ICMIC)*. IEEE, 2017.

4. Khan, Ayub and Shikha. "Combination synchronization of Genesio time delay chaotic system via robust adaptive sliding mode control." *International Journal of Dynamics and Control* (2017): 1-10.

5. Khan, Ayub and Shikha. "Combination synchronization of time-delay chaotic system via robust adaptive sliding mode control." *Pramana* 88.6 (2017): 91.

6. Ayub, Khan and Shikha. "Dynamical behavior and reduced-order combination synchronization of a novel chaotic system." *International Journal of Dynamics and Control* (2017): 1-15.
7. Khan, Ayub and Shikha. "Increased and reduced order synchronizations between 5d and6d hyperchaotic systems." *Indian Journal of Industrial and Applied Mathematics* 8.1 (2017): 118-131.

2016

1. Khan, A., and Shikha. "Mixed tracking and projective synchronization of 6D hyperchaotic system using active control." *Int J Nonlinear Sci* 22.1 (2016): 44-53.

2. Khan, Ayub and Shikha. "Hybrid function projective synchronization of chaotic systems via adaptive control." *International Journal of Dynamics and Control* 5.4 (2017): 1114-1121.

Teaching Experience

- Guest faculty at *Kirorimal college,* Delhi University, India during period 11/01/2017 to 26/04/2017.
- Working as an Assistant Professor from 20th July, 2017 to till date in the Department of Mathematics, *Jesus and Mary College*, University of Delhi, India.

Editorial Board Membership

- International Journal of Nonlinear Dynamics and Control
- International Journal of Mathematical Physics

Reviewer of the Following Journal

- Journal of Control Science and Engineering
- International Journal of Simulation and Process Modelling
- International Journal of Computer Applications in Technology
- International Journal of Nonlinear Dynamics and Control
- Neural Processing Letters

Membership

- Member of the "*Chaos Control and Synchronization Lab*" in "*International group of control systems (IGCS)*".