

Dr. Pawan Kumar

Curriculum Vitae

Publications

Research Articles

2026 Kumari, A., Kumar, A. and **Kumar, P.** Neighbourhood proximity-based clustering algorithm using breadth-first search technique for weighted graphs. *International Journal of Data Science and Analytics*, Springer, Volume 22, pp 120 DOI: `https://doi.org/10.1007/s41060-026-01088-8`

2025 Kumar, A., Kumari, A., **Kumar, P.** et al. Overlapping community detection with a new modularity measure in directed weighted networks. *Data Mining and Knowledge Discovery*, Springer, Volume 39, page 77 DOI: `https://doi.org/10.1007/s10618-025-01153-z`

2025 Kumar, A., **Kumar, P.** and Dohare, R. General Modular Graphs: a benchmark network model for testing community detection algorithms. *Journal of Ambient Intelligence and Humanized Computing*, Springer, 16, 905–919 (2025). `https://doi.org/10.1007/s12652-025-04988-y`

2025 Kumari, A., Kumar, A. and **Kumar, P.** A new modularity metric for disjoint and overlapping community structure evaluation in weighted complex networks. *International Journal of Data Science and Analytics*, Springer, Volume 20, pp 5653–5677 DOI: `https://doi.org/10.1007/s41060-025-00791-2`

2025 Hasan, A., Kamal, A., and **Kumar, P.** k-InfNode: ranking top-k influential nodes in complex networks with random walk *Soft Computing*, Springer, Volume 29(3), 1677-1690, DOI: `https://doi.org/10.1007/s00500-025-10471-9`

2024 **Kumar, P.** A depth-first search approach to detect the community structure of weighted networks using the neighbourhood proximity measure *International Journal of Data Science and Analytics, Springer*, Volume 20, pp 2833-2850, DOI: `https://doi.org/10.1007/s41060-024-00631-9`

2024 Kumar, A., **Kumar, P.** and Dohare, R. Pure expansion-based local community detection *International Journal of Data Science and Analytics, Springer*, Volume 18(317-335), DOI: `https://doi.org/10.1007/s41060-024-00602-0`

2024 Kumar, A., **Kumar, P.** and Dohare, R. Revisiting neighbourhood proximity based algorithm for overlapping community detection in weighted networks *Social Network Analysis and Mining, Springer*, Volume 14(105), DOI: `https://doi.org/10.1007/s13278-024-01257-2`

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2022 **Kumar, P.**, Dohare, R., An interaction-based method for detecting overlapping community structure in real-world networks *International Journal of Data Science and Analytics, Springer* Volume 14, pp 27-44, DOI: `https://doi.org/10.1007/s41060-022-00314-3`

2021 **Kumar, P.**, Dohare, R., Formalising and Detecting Community Structures in Real World Complex Networks *Journal of Systems Science and Complexity, Springer* Volume 34, pp 180-205, DOI: `https://doi.org/10.1007/s11424-020-9252-3`

2019 **Kumar, P.**, Dohare, R., A neighborhood proximity based algorithm for overlapping community structure detection in weighted networks *Frontiers of Computer Science*, Springer, Volume 13, Issue 6, pp 1353-1355. DOI: `https://doi.org/10.1007/s11704-019-8098-0`

Chapters in Books

2020 Kumar, P., Dohare, R., The Presence of Anti-community Structure in Complex Networks *In: Pant M., Sharma T., Basterrech S., Banerjee C. (eds) Computational Network Application Tools for Performance Management. Asset Analytics (Performance and Safety Management). Springer, Singapore.* DOI: `https://doi.org/10.1007/978-981-32-9585-8_13`

IGNOU Self Learning Materials (SLMs)

SLMs for M.Sc.(Mathematics with Applications in Computer Science)

2024 Computer Graphics (MMTE-004), MPDD, IGNOU, ISBN: 978-93-6106-312-1

2021 Graph Theory (MMTE-001), MPDD, IGNOU, ISBN: 978-93-5568-035-8

SLMs for BSCG/BAG

2022 Numerical Analysis (BMTE-004), Volume 2, MPDD, IGNOU, ISBN: 978-93-5568-470-7

Units in SLMs for BSCG/BAG

2021 Algebraic Structure of $\mathbb{R}$, *Real Analysis(BMTC-133), MPDD, IGNOU* (ISBN: 978-93-90773-95-4)

2021 Topological Structure of $\mathbb{R}$, *Real Analysis(BMTC-133), MPDD, IGNOU*, (ISBN: 978-93-90773-95-4)

2021 Sequence and Convergence, *Real Analysis(BMTC-133), MPDD, IGNOU* (ISBN: 978-93-90773-95-4)

2021 Limits of Sequences, *Real Analysis(BMTC-133), MPDD, IGNOU* (ISBN: 978-93-90773-95-4)

2021 Applications, *Real Analysis(BMTC-133), MPDD, IGNOU* (ISBN: 978-93-5568-123-2)

2021 Series of Functions, *Real Analysis(BMTC-133), MPDD, IGNOU* (ISBN: 978-93-5568-123-2)

Conferences/Seminars/Workshops

Invited Talks

"Introducing Network Science to School Students" in the national seminar on Vedic Mathematics Computation and Applications

February 28, 2022 "Application of Graphs" for the UG and PG students of Govt. College Patharia, Distt. - Damoh(MP)

February 12, 2021 "Planar Graphs" for the UG and PG students of Govt. College Patharia, Distt. - Damoh(MP)

October 30-31, 2017 "Analysis of Biological Networks using the igraph R package" in the 8^{th} Bioinformatics Seminar-cum-Hands-on-Training on *R Language & Drug Development* organized by BIF, Jamia Hamdard, New Delhi

Papers Presented

May 27-28, 2022 Pawan Kumar, "How to teach mathematics at school level? ", National Symposium on Mathematics in the light of NEP 2020 & Indian Knowledge System, organized by Indira Gandhi National Open University, New Delhi in collaboration with Vidya Bharati Uchcha Shiksha Sansthan and VIBHA

September 10-12, 2020 Pawan Kumar, "Detecting Community Structure with Pervasive Overlaps in Real World Networks", International Conference on Computational Sciences – Modelling, Computing and Soft Computing (CSMCS-2020) organized by the Department of Mathematics, National Institute of Technology, Calicut, Kerala

November 23-25, 2017 Pawan Kumar and Ravins Dohare, "The presence of anti-community structure in complex networks", 1st International Conference on Recent Advances & Applications in Computer Engineering(RAACE-2017) organized by St. Xavier's College, Jaipur(Raj.)

March 09-10, 2017 Pawan Kumar and Ravins Dohare, "Detecting anti-p-weak communities in complex networks using the concept of p-weak communities", International Conference on Innovative Trends in Mathematics, Computer & Information Sciences (ITMCIS-17) organized by Dept. of Mathematics and Humanities, Maharishi Markandeshwar University, Ambala(HR)

February 08-11, 2017 Pawan Kumar and Ravins Dohare, "Detecting community structure in complex networks - a graph theoretical approach", International Conference on Applicable Analysis (ICAA-2017) organized by Dept. of Mathematics, Shaheed Bhagat Singh College (University of Delhi), New Delhi

December 16, 2015 Pawan Kumar and Ravins Dohare, National Conference on *Interdisciplinary Approaches in Chemical Sciences* (IACS 2015)

Participated

May 27-31, 2021 Online Workshop on "Recent Trends in Domination and Graph Labelling (RTDGL 2021)", organized by the Department of Mathematics, Ramanujan College (DU), New Delhi

November 04, 2017 One Day National Seminar on "Quality Assurance in Higher Education", organized by the Internal Quality Assurance Cell, Jamia Millia Islamia, New Delhi

October 28, 2017 Symposium on Network Biology, organized by Centre for Computational Biology, IIIT Delhi

February 27-28, 2015	DBT-BIF 6th National Workshop on *Advances in Computational Biology and Bioinformatics* (ACBB-2015), organized by the Dept. of Computer Science, Jamia Millia Islamia, New Delhi
June 24 - July 13, 2013	Advanced Instructional School in *Algebraic Combinatorics* conducted in the Indian Statistical Institute, Bangalore
December 4-5, 2012	Workshop on *Matlab as a research tool* organized by the School of Computer and Information Sciences, IGNOU
October 15-18, 2012	Training Programme on *Multimedia e-content Development using Open Source Tools* organized by Inter University Consortium for Technology-enabled flexible education & development (IUC-TEFED), IGNOU, New Delhi
August 23, 2012	Author workshop on *How to write for and get published in scientific journals and publish manuscripts* conducted by Springer in collaboration with the University of Delhi
March 26 - April 07, 2012	Instructional School for Lecturers in *Real Analysis and Measure Theory* (ISLDU-2012), organized by ATM School and supported by NBHM in the University of Delhi, New Delhi
March 17-19, 2010	Workshop cum Training Programme on Modern Trends in Celestial Mechanics and Astronomy, organized by Deshbandhu College(University of Delhi), New Delhi
March 22-26, 2009	Advanced Training Programme on Nonconvex Optimization and its Applications organized by the DST-Centre for Interdisciplinary Mathematical Sciences, Banaras Hindu University, Varanasi

Courses taught

PG level

2011 – 2015, 2018-Present	Programming and Data Structures	*M.Sc. in Mathematics with Applications in Computer Science*
2014 – 2015, 2018-Present	Graph Theory	*M.Sc. in Mathematics with Applications in Computer Science*
2014 – 2015, 2018-Present	Computer Graphics	*M.Sc. in Mathematics with Applications in Computer Science*
2020-2021	Differential Equations and Numerical Solutions	*M.Sc. in Mathematics with Applications in Computer Science*

UG level

2011 – 2015, 2018-Present	Analytical Geometry	*Bachelors Degree Programme (B.Sc./B.A./B.Com.)*
2013 – 2015, 2018-Present	Discrete Mathematics	*B.Sc.*
2009 – 2010, 2020 – 2021	Differential Equations	*B.Sc.(Hons.) Mathematics/BSCG*
2018-Present, 2021-Present	Numerical Analysis	*Bachelors Degree Programme(B.Sc./B.A.)/BSCG(CBCS)*

2009 – 2010	Numerical Methods with C++	*B.Sc.(Hons.) Mathematics*
2009 – 2010	Analysis, Algebra and Mechanics	*B.Sc. Physical Sciences*
2009 – 2010	Calculus and Geometry	*B.Sc. Physical Sciences*
2009 – 2010	Algebra and Geometry	*B.A.*
2008 – 2009	Mathematics-I,II,III and Numerical Methods	*B.Tech.*

Certificate level

2011 – 2015, 2018 – 2020	Preparatory Course in General Mathematics	*Bachelors Preparatory Programme*

Employment

2025–present **Associate Professor** , School of Sciences, Indira Gandhi National Open University, New Delhi

2011–2025 **Assistant Professor** , School of Sciences, Indira Gandhi National Open University, New Delhi

2009–2011 **Assistant Professor**, Department of Mathematics, Maitreyi College(University of Delhi), New Delhi

2008–2009 **Lecturer**, Department of Applied Sciences and Humanities, Echelon Institute of Technology, Faridabad

Education

2015–2020 **Ph.D. in Mathematics**, *Centre for Interdisciplinary Research in Basic Sciences,* Jamia Millia Islamia, New Delhi
Title: Design of Algorithms for Community Structure Detection in Real World Complex Networks

2012–2013 **Post Graduate Diploma in Distance Education**, Indira Gandhi National Open University, New Delhi, *%Marks – 77.00*

2006–2008 **M.Sc. in Mathematics**, Indian Institute of Technology, New Delhi, *CGPA – 6.59*

2003–2006 **B.Sc.(Hons.) in Mathematics**, Dayalbagh Educational Institute, Agra, *%Marks – 74.50*

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