



Prof. (Dr.) Pankaj Kumar Roy

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*Name (in Block Letters)* : PANKAJ KUMAR ROY

*Date of birth* : 24<sup>th</sup> January, 1975

*Sex* : Male

*Nationality* : Indian

#### *Academic Qualifications*

- **Bachelor of Civil Engineering** from NIT Silchar, Assam
- **Masters of Civil Engineering** from Jadavpur University
- **Ph.D. in Engineering** (Water resources engineering and management) from Jadavpur University

#### *Experiences*

- **Industrial:** 2 years
- **Teaching and Research:** 15 years and onwards
- **Research guidance:** Ph.D. level- 28 scholars (12 awarded)  
PG level- 110 scholars (awarded)
- **Project completed:** Twenty (20)  
Consultancy- Thirty (30)
- **Project on-going:** Four(4)
- **Publications:** Journal- 46 (National), 87 (International)
- **Books/Monographs/Edited:** Thirteen (13)
- **Lecture delivered as invited speaker:** Twelve (12)
- **Refresher/Training courses/Seminar/Workshop organised/attended:** Fifteen (15)
- **Member of Learned Societies and /Professional Bodies:** Ten (10)
- **Project undertaken (Project Investigator and co-Investigator):** Forty eight (48)

#### *Teaching Experience*

Designation	Institute	Period
Assistant Professor	Jadavpur University	2006-2014
Associate Professor		2014-2017
Professor		2017-till date
Dean		2019-till date
Director		2019-till date

### *Achievements/ Awards*

- Young Scientist (Institute of Engineers, Govt. of India)
- 1st National Doctorate Fellow by AICTE at JU (Govt. of India)
- Internship Fellowship (University of Pisa, Italy)
- IEI Young Engineers Award (Institution of Engineers (India), Government of India)

### *Major Research Interest:*

Hydraulics and Water Resources Engineering, Fluid Mechanics, Climate Change and its impact on Water Resources Engineering, Surface Water Pollution and its mitigation, Groundwater Dynamics, Watershed Technology and Management, Forest Hydrology, Water Conservation Technology, Hydro-Geological Investigation, Surface and Ground Water Interaction, Solid Waste Management, Hydrological and Environmental Modelling, Environmental Monitoring, Water and Waste Water Characteristics, Geophysical Fluid Dynamics, Anti Bacteriological Studies in Surface and Ground Water, Hydraulic Structure and Hydel Power Engineering.

### *Doctoral Guidance under Faculty of Interdisciplinary Studies Law & Management, Jadavpur University*

Completed: 21

In Progress: 12

<b>Sl. No.</b>	<b>Name of the Student (No of Supervisor)</b>	<b>Status (Year)</b>
1.	Gourab Banerjee (3)	Awarded (2017)
2.	Jayanta Debbarma (2)	Awarded (2018)
3.	Tarun Kanti Debnath (3)	Awarded (2018)
4.	Jayanta Pal (3)	Awarded (2016)
5.	Kaberi Majumder (3)	Awarded (2016)
6.	Mandira Ghosh (2)	Awarded (2016)
7.	Soumyajit Biswas (2)	Awarded (2016)
8.	Anindita Bhattacharyya (3)	Awarded (2015)
9.	Bipal Kumar Jana (2)	Awarded (2014)
10.	Rabindranath Barman (2)	Awarded (2012)
11.	Mrinmoy Majumder (2)	Awarded (2010)
12.	Manish Pal (2)	Awarded (2010)
13.	Arunkanti Biswas (3)	Awarded (2010)
14.	Srijit Biswas (2)	Awarded (2009)
15.	Somnath Pal (3)	Awarded (2018)
16.	Jayanta Debbarma (2)	Awarded (2018)
17.	Tarun Kanti Debnath (3)	Awarded (2018)
18.	Priyabrata Adhikery (2)	Awarded (2018)
19.	Mihir Pal (3)	Awarded (2019)
20.	Debanjana Chatterjee (2)	Submitted (2019)
21.	Pramita Debsarkar (1)	Submitted (2019)
22.	Sritama Chatterjee (1)	Ongoing (2016)
23.	Minakshi Ghosh (1)	Ongoing (2016)
24.	Kallol Saha (2)	Ongoing (2016)
25.	Arkaprabha Majumder (2)	Ongoing (2016)

26.	Nil Sadhan Mondal (3)	Ongoing (2015)
27.	Angshuman Pal (1)	Ongoing (2017)
28.	Sukanta Chatterjee (1)	Ongoing (2017)
29.	Arnab Ghosh (2)	Ongoing (2016)
30.	Sudipa Halder (2)	Ongoing (2019)
31.	Swetasree Nag (2)	Ongoing (2019)
32.	Saurabh Kumar Basak (2)	Ongoing (2019)
33.	Debashis Karmakar (2)	Ongoing (2019)

### *Post-Doctoral guidance*

1. Sudeshna Banerjee (2019)

### *Journal Publications*

#### *International-*

- V. Chakraborty, P. Das & **P.K. Roy** (2019) 'Carbonaceous materials synthesized from thermally treated waste materials and its application for the treatment of Strontium metal solution: Batch and optimization using Response Surface Methodology', *Environmental Technology & Innovation*, pp. 1-11.
- **P.K. Roy**, M. Ghosh & M. Biswas Roy (2018) 'Selection of multi-drug resistant bacteria from water treatment plants', *Desalination and Water Treatment*, 107, pp. 279–284.
- A. Kumar, M. Biswas Roy, **P.K. Roy**, & J. Mike Wallace (2018) 'Assessment of Arsenic Removal Units in Arsenic-Prone Rural Area in Uttar Pradesh, India', *Journal of the Institution of Engineers (India)*.
- **P.K. Roy**, A. Majumdar, S. Pal, G. Banerjee, M.B. Roy, J. Debbarma and A. Majumder (2018) 'Development of an Environmentally Sustainable Approach for Safe Disposal of Arsenic-Rich Sludge', *Handbook of Environmental material Management*, 3, pp. 1-4.
- **P.K. Roy**, T.K. Debnath, M. Pal, and J. Pal (2017) 'Analysis of Physical Composition of Municipal Solid Waste of Agartala City', *International Research Journal of Advanced Engineering and Science*, 2, pp. 87-89.
- **P.K. Roy**, S. Chaudhuri, S. Halder, S. Hossain, G. Banerjee and J. Debbarma (2017) 'Developing a Correlation for Estimation of Aquifer Layer using Resistivity Survey with Lithological Logs in Critical Terrain condition', *Asian Journal of Water, Environment and Pollution*, 14, pp. 9-17.
- **P.K. Roy** & M. Ghosh (2017) 'Chlorine resistant bacteria isolated from drinking water treatment plants in West Bengal', *Desalination and water treatment*, 79, pp. 103-107.
- **P.K. Roy**, M. Pal, N. R. Samal, M. B. Roy (2016) 'Modelling of diurnal profile of surface air temperature and surface dissolved oxygen of lake water', *Current Science*, 111(5), pp. 882-885.
- **P.K. Roy**, M. Pal, N. R. Samal, M. B. Roy (2016) 'Fresh water lake water model application for seasonal variation Of Latent And Sensible Heat Fluxes From The Water Surface of Rudrasagar, Lake, Tripura', *Imperial Journal of Interdisciplinary Research(IJIR)*, 2(5), pp. 1306-1310.
- **P.K. Roy**, A. Mazumdar J. Pal, M. Pal (2016) 'Strength Assessment of Neer Mahal Palace: A Historical Masonry Structure on Rudrasagar Lake, India', *ARPN Journal of Engineering and Applied Sciences*, 11(1), pp. 699-705.

- **P.K. Roy, A. Mazumdar J. Pal, M. Pal (2016)** 'A Study on Mitigation Measures for the Development of Neermahal Palace and Surrounding Rudrasagar Lake Area in Tripura, India', *International Journal of Applied Engineering Research*, 11(4), pp. 2615-2619.
- **P.K. Roy, A. Mazumdar J. Pal, M. Pal (2016)** 'Water Quality Index for Assessment of Rudrasagar Lake Ecosystem, India', *International Journal of Engineering Research and Applications*, 6(1), pp. 98-101.
- **P.K. Roy, A. Mazumdar, J. Pal, M. Pal (2016)** 'Quantitative Assessment of Water of Rudrasagar Lake, Tripura, India', *European Journal of Advances in Engineering and Technology*, 3 (3), pp. 45-48.
- **P.K. Roy, A. Mazumdar, S.Pal, G. Banerjee, R. Chakraborti (2016)** 'Integrated, Sustainable and Eco-friendly surface and groundwater management in an arsenic affected rural area of West Bengal, India', *International Journal of Environmental Engineering*, 3(1), pp. 60-63.
- **P.K. Roy, M. B. Roy & D. Chatterjee, T. Mukherjee (2016)** 'Environmental threat to wetland biodiversity on migratory bird: a case study of peri-urban area of West Bengal', *Asian Journal of Current Research*, 1(1), pp. 30-38.
- **P.K. Roy, J. Debbarma, S. Halder, G. Banerjee & M. Pal, (2016)** 'Estimating Groundwater Volumetric Mass Balance with Hydraulic Head using Groundwater Modeling System in Tripura, India', *Asian Journal of Current Research*, 1(1), pp. 19-29.
- **P.K. Roy, A. Majumdar & S. Ray (2016)** 'Quality of packaged drinking water in Kolkata City, India and risk to public health', *Desalination and water treatment*, 57(59), pp. 1-9.
- **P.K. Roy, A. Majumdar, M.Ghosh, D. Kumar (2016)** 'Disinfection of water by various techniques – comparison based on experimental investigations', *Desalination and water treatment*, 57(58), pp. 1-10.
- **P.K. Roy, A. Mazumdar, P. Adhikary (2015)** 'Maintenance contractor selection for small hydropower project: A fuzzy multi-criteria optimization technique approach', *International Review of Mechanical Engineering*, 9 (2), pp. 174-182.
- **P.K. Roy, A. Mazumdar, M.B. Roy & D. (2015)** 'Impact of Forest Intervention on Water and Soil Quality-Case Studies', *Conference on ASET (ISBN: 978-1-63248-084-2)*, pp. 43-47.
- **P. K. Roy, A. Majumder, A. Mazumdar, S.Pal, G. Banerjee, R. Chakraborti & M. Banik (2015)** 'Integrated, Sustainable and Eco-friendly Surface and Groundwater Management in an Arsenic affected Rural Area of West Bengal, India', *Conference on ASET (ISBN: 978-1-63248-084-2)*, pp. 39-42.
- **P.K. Roy, A. Mazumdar, P. Adhikary (2015)** 'Optimal Turbine Selection for Eco-Friendly Micro Hydro Project: Application of Fuzzy-MCDM', *International Journal of Applied Environmental Sciences*, 10 (3), pp. 847-858.
- **P.K. Roy, M.Pal, & M.B. Roy (2015)** 'Sinusoidal Model Development for the study of Diurnal Variation OF Surface Dissolved Oxygen for the Lake Rudrasagar in Pre-Monsoon Period', *International Journal of Engineering Science Invention*, 4(1), pp. 10-18.
- **P.K. Roy, M.Pal, N.R. Samal, & M.B. Roy (2015)** 'Electrical Conductivity of Lake Water as Environmental Monitoring –A Case study of Rudrasagar Lake', *Journal of Environmental Science, Toxicology and Food Technology*, 9(3), pp. 66-71.

- **P.K. Roy**, A. Mazumdar, M.B. Roy, N. R. Samal (2015) 'Integrated Assessment of Impact of Water Resources of Important River Basins in Eastern India under Projected Climate Conditions', *Global NEST*, 17(3), pp. 594-606.
- **P.K. Roy**, A. Mazumdar, P. Adhikary (2014) 'Multi-dimensional feasibility analysis of small hydropower project in India: A case study', *ARPN Journal of Engineering and Applied Sciences*, 9 (1), pp. 80-84.
- **P.K. Roy**, A. Majumder, M. Ghosh, (2014) 'Effect of arsenic rich soil and groundwater on paddy cultivation', *World Applied Sciences Journal*, 29 (2), pp. 165-170.
- **P.K. Roy**, A. Majumder, A. Mazumdar & M.B.Roy (2014) 'Role of sewage fed fisheries for treatment of dry weather flow of Kolkata city maintaining the Eco-toxicity balance', *Journal of Chemical and Pharmaceutical Research*, 6 (9), pp. 328-333.
- **P.K. Roy**, A. Majumder & A. Mazumdar, D. Ray, S. Pal, G. Banerjee (2014) 'Qualitative and quantitative assessment of Pollution load in river Ganga in West Bengal using statistical technique', *World Applied Sciences Journal*, 29(5), pp. 634-640.
- **P.K. Roy**, A. Majumder P. Naskar, D. Ray, G. Banerjee (2014) 'Study on application of conventional and non-conventional methods for De-fluoridation of ground water', *Asian Journal of Water, Environment and Pollution*, 11(3), pp. 9-15.
- **P.K. Roy**, A. Mazumdar, N.R. Samal, M.B. Roy (2014) 'Limnological Comparisons of Threats to aquatic life owing to Thermal Stratification in two Morphometrically different urban shallow lakes', *Sustainability, Agri, Food and Environment Research*, 2(1), pp. 13-30.
- **P.K. Roy**, N.R. Samal, M. Majumadar, S. Bhattacharya & M.B. Roy (2014) 'Six Years Major Historical Urban Floods in West Bengal State in India: Comparative Analysis Using Neuro-Genetic Model', *American Journal of Water Resources*, 2(2), pp. 41-53.
- **P.K. Roy**, M.B.Roy, D. Chatterjee, & N. R. Samal (2014) 'A Review of Published Forest Hydrology Research 1990-2013: Forest Hydrology and Hydrological Process', *Zenith International Journal Of Multidisciplinary Research*, 4(8), pp. 9-22.
- **P.K. Roy**, M. Pal & M.B. Roy, (2014) 'Resilience and Sustainability of an Aquatic Eco-system in North East of India', *Galaxy International Interdisciplinary Research Journal*, 2(9), pp. 100-109.
- **P. K. Roy**, M. Pal, N.R. Samal, M. B. Roy (2014) 'Temperature and dissolved oxygen stratification in the lake Rudrasagar :Preliminary investigation', *Sustainability, Agri, Food and Environmental Research*, 2(1), pp. 1-12.
- **P. K. Roy**, Asis Mazumdar K. Majumder & S. Datta (2014) 'Study of Impact of Climate Change on Water Availability in the Gumati Hydropower Plant, Tripura, India using Artificial Neural Network', *ARPN Journal of Engineering and Applied Sciences*, 9 (6), pp. 891-894.
- **P.K. Roy**, A. Mazumdar & J. Debbarman (2013) 'Assessment of Dynamic Groundwater Potential of Agartala Municipality Area', *Journal of Emerging Trends in Engineering and Development*, 1(3), pp. 220-231.
- **P.K. Roy**, A. Mazumdar & P. Adhikary (2013) 'Selection of Hydro-Turbine Blade Material: Application of Fuzzy (MCDA)', *International Journal of Engineering Research and Applications*, 3 (1), pp. 426-430.
- **P.K. Roy**, A. Mazumdar & P. Adhikary (2013) 'Indian SHP Project Planning and Development: A Review of Decision Support System Tools', *International Journal of Engineering Research & Technology (IJERT)*, 2(6), pp. 1386-1391.

- **P.K Roy**, A. Mazumdar P. Adhikary & S. Kundu, (2013) 'Fuzzy Logic based user friendly Pico-Hydro Power generation for decentralized rural electrification', *International Journal of Engineering Trends & Technology*, 4(4), pp. 507-511.
- **P.K. Roy**, A. Mazumdar & P. Adhikary (2012) 'Selection of Penstock Material for Small Hydro Power Project – A Fuzzy Logic Approach', *International Journal of Advanced Scientific and Technical Research*, 6(2), pp. 521-528.
- **P.K. Roy**, A. Mazumdar & S. Chakraborty (2012) 'Intelligent Identification of Operation Zones of Sanitary Drainage System for High Buildings; The Application of The Fuzzy Logic', *International Journal of Advanced Scientific and Technical Research*, 6(2), pp. 141-151.
- **P.K. Roy**, A. Mazumdar M. Biswas Roy & N.R. Samal (2012) 'Water Quality Monitoring by Multivariate Statistical Methods in the Alpine Lake of Darjeeling Himalaya, India', *International Journal of Advanced Scientific and Technical Research*, 6(2), pp. 115-131.
- **P.K. Roy**, A. Mazumdar & P. Adhikary (2012) 'Multi Criteria Decision Analysis of manpower shift scheduling for cost effective Hydro Power Generation', *Journal of Emerging Trends in Engineering and Development*, 7(2), pp. 116-127.
- **P.K. Roy**, A. Mazumdar S. Pal, & UA. Majumder, (2012) 'Development of Technological Options for Treatability Study of Chrome Tannery Effluent', *International Journal of Advanced Scientific and Technical Research*, 6(2), pp. 529-540.
- **P.K. Roy**, A. Mazumdar K. Majumdar & M. Pal (2012) 'Prediction of Surface Water Availability for Gumti River Basin and its Reservoir at Hydro Power Plant, Tripura, India', *International Journal of Applied Engineering Research*, 6(15), pp. 1811-1818.
- **P.K. Roy**, A. Mazumdar K. Majumdar, & S. Datta (2012) 'Design Criteria of Micro Hydro Power Plant at Gumti River, Tripura, India', *International Journal of Engineering Studies*, 4(3), pp. 231-236.
- **P.K. Roy**, A. Mazumdar G. Banerjee, A. Kar, A. Majumder, & M. Biswas Roy (2012) 'A Study to ascertain the Optimum Yield from Groundwater Source in the Eastern Part of Kolkata Municipal Corporation Area in West Bengal, India', *European Journal of Sustainable Development*, 1(2), pp. 97-112.
- **P.K. Roy**, A. Mazumdar M. Biswas Roy, M. Majumder, & N.R. Samal (2012) 'Impact of Land Use and Aquatic Plants on the Water Quality of the Sub-Tropical Alpine Wetlands in India: A Case Study Using Neuro-Genetic Models', *Journal of Water Resource and Protection*, 4(), pp. 576-589.
- **P.K. Roy**, T.K.Debnath, M.Pal, & S.Datta (2012) 'A Critical Study on quantity and quality of Municipal Solid Wastes of Agartala, Tripura, India', *International Journal of Applied Engineering Research*, 7(9), pp. 1035-1041.
- **P.K. Roy**, A. Mazumdar M. Biswas Roy, & N.R. Samal (2012) 'Socio-economic Valuations of Wetland based Occupations of Lower Gangetic Basin through Participatory Approach', *Environment and Natural Resources Research*, 2(4), pp. 30-44.
- **P.K. Roy**, A. Mazumdar & P. Adhikary (2012) 'Safe and Efficient Control of Hydro Power Plant by Fuzzy Logic', *International Journal of Engineering Science & Advanced Technology*, 2(5), pp. 1270-1277.
- **P.K. Roy**, A. Mazumdar (2012) 'Water Resources in India under Changed Climate Scenario', *International Journal of Engineering Research & Applications*, 3(1), pp. 954-961.

- M. B. Roy, **P. K Roy**, N. R. Samal, & A. Mazumdar (2012) 'Impact of Land Use and Aquatic Plants on the Water Quality of the Sub-Tropical Alpine Wetlands in India: A Case Study using Neuro-Genetic Models', *Journal of Water Resource and Protection*, 4(8), pp. 576-589.
- P. Adhikary, **P. K. Roy**, A. Mazumdar, (2012) 'Multi Criteria Decision Analysis of manpower shift scheduling for cost effective hydro power generation', *International Journal of Emerging trends in Engineering and Development*, 7(2), pp. 116-127.
- **P. K. Roy**, G. Banerjee, A. Mazumdar, A. Kar, A. Majumder & M. B. Roy (2012) 'A Study to ascertain the Optimum Yield from Groundwater Source in the Eastern Part of Kolkata Municipal Corporation Area in West Bengal, India', *European Journal of Sustainable Development*, 1(2), pp. 97-112.
- M. B. Roy, **P. K Roy**, N. R. Samal, & A. Mazumdar (2012) 'Socio-economic valuations of Wetland based Occupations of Lower Gangetic Basin through Participatory Approach', *Environment and Natural Resources Research*, 2(4), pp. 30-44.
- P. Adhikary, **P. K. Roy**, A. Mazumdar (2012) 'Safe and Efficient control of Hydro Power by Fuzzy Logic', *International Journal of Engineering Science & Advanced Technology*, 2(5), pp. 1270-1276.
- T.K. Debnath, M. Pal, S. Datta & **P. K. Roy** (2012) 'A Critical Study on quantity and quality of Municipal Solid Wastes of Agartala, Tripura, India', *International Journal of Applied Engineering Research*, 7(9), pp. 1035-1041.
- K. Majumdar, M. Pal, **P. K. Roy** & A. Mazumdar (2011) 'Design Criteria of Micro Hydro Power Plant at Gumti River, Tripura, India', *International Journal of Engineering Studies*, 4(3), pp. 231-236.
- K. Majumdar, M. Pal, **P. K. Roy** & A. Mazumdar (2011) 'Prediction of Surface Water Availability for Gumti River Basin and its Reservoir at Hydro Power Plant, Tripura, India', *International Journal of Applied Engineering Research*, 6(15), pp. 1811-1818.
- N.R. Samal, P.Saha, **P.K. Roy**, M.B. Roy, R. V. Ramana & A. Mazumdar (2011) 'Limnological analysis of an urban polluted lake in Bangalore city in India in India', *Journal. Desalination and Water Treatment*, 30, pp. 217-228, DOI: 10.5004/dwt.2011.2025.
- M. B. Roy, N. R. Samal, **P.K. Roy** & A. Mazumdar (2011) 'Watershed Management With Special Emphasis On Fresh Water Wetland: A Case Study of Mathura Beel In West Bengal, India', *Global Network of Environmental Science and Technology*, 13 (1), pp. 1-10.
- **P.K. Roy**, A.Majumder, A.Mazumdar, M. Majumder, & M. B. Roy (2011) 'Impact of enhanced flow on the flow system and wastewater characteristics of sewage-fed fisheries in India', *Journal of Environmental Science & Technology*, 5(7), pp. 512-521.
- **P. K. Roy**, N. R. Samal, M. B. Roy & A. Mazumdar (2010) 'Soil Carbon and Nutrient Accumulation under Forest Plantations in Jharkhand State of India', *Clean – Soil, Air, Water*, 38(8), pp. 706-712.
- M. B. Roy, N. R. Samal, **P. K Roy** & A. Mazumdar (2010) 'Human wetland dependency and socio-economic evaluation of wetland functions through participatory approach in rural India', *Water Science and Engineering*, 3(4), pp. 467-479.
- M. Majumder, R.N. Barman, **P.K. Roy**, B.K. Jana, A. Mazumdar (2009): Application of neuro-genetic algorithm to determine reservoir response in different hydrologic adversaries. *Soil & Water Res.*, 4: 17-27.

- S. Biswas, **P. K. Roy** & S. Datta 'Selection of Most Suitable Site for an Irrigational Project: Use of Fuzzy Logic', *International Journal of Fuzzy Systems & Rough Systems*, 1(1), pp. 41-44.
- B. Mukhopadhyay, M. Majumder, R. N. Barman, **P. K. Roy** & A. Mazumdar (2009) 'Verification of filter efficiency of horizontal roughing filter by Weglin's design criteria and Artificial Neural Network', *Drink. Water Engineering and Science Discussions*, 1(), pp. 117-133, ISSN: 1996-9473, eISSN : 1996-9481.
- B. K. Jana, M. Majumder, **P.K. Roy** & A. Mazumdar (2009) 'Trend of Carbon Dioxide Emission from Advance Vehicular System Predicted Through Neural Network and Genetic Algorithm', *International Journal of Applied Environmental Sciences*, 4(1), pp. 83-104.
- M. Biswas, M. Majumder, **P. K. Roy** & A. Mazumdar (2009) 'Application of Artificial Neural Network to Measure the impact of Increasing Depth on Agriculture and Fishing activities of Bhomra Beel', *Journal of Environmental Science Published in enviro. philica .com*. Article 150.
- B. K. Jana, S. Biswas, M. Majumder, **P. K. Roy** & A. Mazumdar (2009) 'Carbon Sequestration Rate and Above Ground Biomass Carbon Potential of Four Young Species', *Journal of Ecology and Natural Environment, Academic Journals-International*, 1(2), pp. 15-24.
- M. Majumder, R.N. Barman, **P.K. Roy**, B. K. Jana, & A. Mazumdar (2009) 'Application of Neuro-genetic Algorithm to Determine Reservoir Response in Different Hydrologic Adversaries', *Journal of Soil & Water Resources, Prague, Checkoslovakia*, 4 (1), pp. 17-27.
- B. K. Jana, M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Trend of Carbon Dioxide Emission from Advance Vehicular System Predicted Through Neural Network and Genetic Algorithm', *International Journal of Applied Environmental Sciences*, 4(1), pp. 83 -104.
- M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Impact of Climatic Uncertainty on Water Limitation of River Damodar', *Journal of Water Resources Management*, pp. 17-38.
- M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Estimating Water Efficiency of River Damodar with the help of Water Footprint and Virtual Water', *Journal of Hydrologic Engineering*, 1
- M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Impact of Climate Change on Agricultural Productivity of Two Large Scale Indian River Basin', *Journal of Hydrologic Engineering*, 1, pp. 115-146.
- M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Estimating Spatial Variation of Time of Concentration in an Undulating River Basin', *International Journal of Hydro-Climatic Engineering*, ISSN: 1995-0908
- M. Majumdar, **P. K. Roy** & A. Mazumdar (2009) 'Estimating Uncertainty in Reservoir Storage with the help of GIS and Neuro-genetic models', *International Journal of Integrated Resource Management*.
- S. Biswas, **P.K. Roy** & S. Datta (2008) 'TWRM : An Application of Fuzzy Logic in Environmental Impact Assessment', *International Journal of Applied Environmental Sciences (IJAES)*, 3(3).
- B. K. Jana, M. Majumder, **P. K. Roy**, A. Mazumdar 'A Review on GHG Emission as CO<sub>2</sub> equivalent from Transport System in View of Advanced Vehicular Technology and Improved Fuel Quality', *Journal of Environmental Science Philica International*. Article No. 131
- B. K. Jana, S. Biswas, M. Majumder, **P. K. Roy**, A. Mazumdar (2008) 'Carbon Sequestration in Urban and Recreational Forest: A Case Study at Banobitan in Kolkata', *Journal of Anthropology Philica International*, Article No. 132.



- M. Majumder, **P. K. Roy** & A. Mazumdar (2008) 'Potential Artificial Neural Network in Estimating Evapo-transpiration from Limited Climated Data of the River Damodar Basin in India', International Journal of Earth Science, Copernicus Publisher, Germany, pp. 117-120.
- R. N. Barman, B. Mukhopadhyay, M. Majumder, **P. K. Roy** & A. Mazumdar (2008) 'Estimation & Calculation of a relationship between Dispersion no., Reynolds no., Porosity & Hydraulic Gradient in Horizontal Roughing Filter', Journal of Agricultural, Food & Environmental Sciences, New York, USA, 2(1), ISSN: 1934-7235.
- M. Majumder, **P. K. Roy** & A. Mazumdar (2007) 'Optimization of the water use in the river Damodar in West Bengal in India, an Integrated Multi-Reservoir System with the help of Artificial Neural Network (ANN)', International Journal of Engineering, SJI-New York , USA, 2(2).
- **P. K. Roy** & A. Mazumdar (2005) 'Hydrologic Impacts of Climatic Variability on Water Resources of Damodar River Basin in India', Proceedings of Symposium S6 held during the Seventh IAHS Scientific Assembly at Foz do Iguacu, Brazil, IAHS Publication, 295, 15(3), pp. 147-156. Print ISSN 0021-1672
- **P. K. Roy** & A. Mazumdar (2005) 'Error functions analysis of runoff hydrograph of Damodar River Basin in India (HEC-HMS)', Journal of Water Resources Engineering,(BUET, Dhaka), 20, pp. 105-117.

#### *National-*

- **P.K. Roy** , Asis Mazumdar, S. Banerjee (2017) 'Application of computational fluid dynamics in the analysis of aquifer response during pumping', Indian Journal of Environmental Protection, 37(2), pp. 93-102 .
- **P.K. Roy**, A.Majumder, P. Debsarkar (2016) 'Biogas Production through anaerobic digestion process from different kinds of wastes- A review', Indian Journal of Environmental Protection, 36(3), pp. 248-252.
- **P.K. Roy**, A. Mazumdar M.B.Roy, R. Talukdar, R. Roy (2015) 'Man-Wetland Dependency ratio with respect to socio-economic scenario of Khalsi Wetland, Haringhata, Nadia', Indian Journal of Environmental Protection , 35(11), pp. 890-900.
- **P.K. Roy**, A, Majumder A. Pal, M. Ghosh (2015) 'Study on the Performance of Dual Media Filter for Water Purification', Indian Journal of Environmental Protection, 35(11), pp. 916-925.
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- **P.K. Roy**, A.Mazumdar M.B. Roy & N.R. Samal (2016) 'A Comparative Study of Labour Participation in Three Wetland Regions of West Bengal, India', J. Inst. Engg. India, 97(2A), pp. 81-91.
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- **P. K. Roy** & A. Mazumdar (2005) 'A Comparative Study of Stream Flow between lumped and distributed model of Ajoy River Basin Volume', National Journal of Survey, Conservation & Utilization of Water Sources (UWS), 2005(Jan 20-21), pp. 72-74.
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#### *Books/Reports/General articles published*

- Vulnerability Assessment of the Lower Ganga- Brahmaputra-Meghna Basins, NATCOM Workshop on Vulnerability Assessment and Adaptation for Water Resources, Coastal Zone, and Human Health, sponsored by MoEF, GoI, P.K., Roy, D. Roy & A. Mazumdar, June 2003
- Climate Change and India: Vulnerability Assessment and Adaptation (Chapter 5), UNFCCC-NATCOM-UNDP-GoI, P.K.Roy & A. Mazumdar, 2003
- A critical measure of rainwater harvesting for sustainable livelihood of rural communities: a case study in West Bengal, Technology to Society ; A Compendium of Action Research Publications and Reports on Services to Community and Economy under TEQIP, pp. 14-20, 2008
- Published a book titled “**Conservation of Ecosystem Services through Participatory Management: Cases of Wetlands in West Bengal, India**” by Malabika Biswas Roy, Pankaj Kumar Roy and Asis Mazumdar: ISBN 978-3-659-40541-9. LAP LAMBERT Academic Publisher, AV Akademikerverlag GmbH & Co. KG, Germany
- Published a book titled “**A Review of Environmental Impact Assessment of a Hydropower Project**” by Pankaj Kumar Roy, Asis Mazumdar and Debjani Bhattacharya: ISBN 978-3-659- 34074-1. LAP LAMBERT Academic Publisher, AV Akademikerverlag GmbH & Co. KG, Germany
- Published a text book titled “Water Resources Engineering (3rd Edition)” by David A Chin, Pankaj Kumar Roy and Asis Mazumdar: ISBN 9780273785910. APH Publisher containing seventeen chapters
- Development Of An Environmentally Sustainable Approach For Safe Disposal Of Arsenic Rich Sludge, Handbook Of Environmental Material Management, Springer International Publication, Pankaj Kumar Roy
- A Decentralized Integrated Approach Of Water And Waste Water Management In Rural West Bengal, Handbook Of Environmental Material Management, Springer International Publication, Pankaj Kumar Roy

### *Reference Books/Textbooks published by International Publishers*

- Water Resources Engineering (3rd Edition) by David A Chin, ISBN 9780273785910. APH publisher.

### *Number of Book Chapters contributed in Edited Volumes*

- A case Study-An Integrated Approach of Wetland Management in Nadia District, West Bengal, Fundamentals of LIMNOLOGY ISBN 81- 7648-919-0. Pearson International Edition, M.Biswas, P.K.Roy and A.Mazumdar, Chapter-21, Page 143-151
- A case Study on Water Resources Scenario in West Bengal, Fundamentals of LIMNOLOGY ISBN 81-7648-919-0. APH publisher, P.K.Roy and A.Mazumdar, Chapter-22, Page 152-155
- Biodiversity and Carbon Sequestration, two important values of the Wetlands of West Bengal, Environmental Engineering, ISBN 978- 81-7035-644-8, Daya publishing house, M.Biswas, B.K.Jana, M. Majumder, S. Biswas, P.K.Roy, A. Majumder and A.Mazumdar, Chapter 8, page 58-68
- The Ganga: Environmental Degradation and Conservation, The East Kolkata Wetland, Unto Mother Ganga, ISBN 978-81-216- 1566-2, Central Chinmaya Mission Trust, P.K.Roy, A. Majumder and A. Mazumdar, Chapter 13, page 94-98
- Study of Water Quality of Packaged and Municipal Supply Drinking Water With Performance Evaluation of Stand-Alone Filters, P. K. Roy, S. Ray, A. Majumder, “*Bottled and Packaged Water*”, Chapter 3, Volume 4, Page-63-81, ISBN: 978-0-12-815272-0 (print), ISBN: 978-0-12-815704-6 (online)

### *Member/Expertise contribution*

- Acted as a sectional recorder of Engineering Science section of The Indian Science Congress Association, for the period of 2018-19 and 2019-20.
- Regular reviewer of many reputed international and national journals.
- Member of Individual Research Committee for Ph.D. in Civil Engineering Department, IEST, Shibpur.
- Member of Individual Research Committee for Ph.D. in Civil Engineering Department, Jadavpur University
- Member of Individual Research Committee for Ph.D. in Architectural Department, Jadavpur University
- Member of School Research Committee of School of Environmental Studies
- Life Member- No. L28414, The Indian Science Congress Association in 2016
- Invited to serve as Coordinator for 64th Orientation Program organized by UGC-HRDC, JU during the period between February 6 to March 4, 2017 at UGC-HRDC, Salt Lake Campus, and Jadavpur University.
- Service rendered as an Interviewer and Member in the team for Scholar Selection under PURSE Phase-II awarded by the DST to JU on 2016.
- Member of Purchase Committee of ISLM, JU
- Member of Organizing Committee of TEQIP sponsored training program
- Member of governing body of J.D. Birla Institute, Kolkata

*Research projects and consultancy carried out/ on-going funded by government funding agencies / industries or organization of National and International repute*

**A. Research Projects**

<b>Sl. No.</b>	<b>Project Titles</b>	<b>Funding Agency</b>
1	Scientific Assessment of Coastal Vulnerability and Sustainable Ecosystem management under Climate Change Scenario	Ministry of Science, Department of Science and Technology, NRDMS
2	Study of Surface and sub-surface water flow and storage characteristics for creation of sustainable source on rain fed river in connection with comprehensive water security plan in rural West Bengal	RUSA 2.0 Jadavpur University Under MHRD, Govt. of India
3	Development of Strategy for Sustainable Drinking Water Source Creation through Natural Recharge for the Mitigation of Fluoride Contamination in Hydro-Geologically Critical Area of West Bengal	RUSA 2.0 Jadavpur University Under MHRD, Govt. of India
4	Study To Develop Appropriate Methods For Safe Disposal Of Arsenic-Rich Sludge	DST (Govt. of West Bengal)
5	Development of Cost-Effective Technology for Recharging in Over-Exploited Groundwater Resources in Rural Areas in West Bengal	DST, WTI, Govt. of India
6	Effect of Climate Change on Water Resources of Some Important River Basins in Eastern India	Ministry of Water Resources, Govt. of India
7	Study on Improving Benefit Transfer for Wetland Valuation: Water Environment and Economic Value of Ecosystem Services through People Participation in Bhagirathi-Hooghly Basin	UGC, Govt. of India
8	Monitoring of Grossly Pollution Industries (GPIs) discharging into the River Ganga and its Tributaries for compliance verification	CPCB, Govt. of India
9	Design Of Effluent Treatment Plant Of Capacity 0.1 MLD For Haringhata Dairy, Mohonpur, Nadia	Kolkata Metropolitan Development Authority
10	Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) of KMC Project for utilizing KMC land on the eastern side of E.M. Bye-pass opposite Silver Spring Housing Complex	Kolkata Municipal Corporation
11	Appraisal of Sewerage Network of Zone-III of Gangtok town of Sikkim under National River Conservation Plan	NRCD, MoEFCC, Govt. of India
12	Assessment of the quantum of silt dredged out from the pre-identified demarcated area of Settling Tanks (80,000 m <sup>3</sup> ) through pre and post measurement and monitoring of the measurement methodology adopted and random verification thereof.	Kolkata Municipal Corporation, IGWTP, WSD, Govt. of WB
13	Energy-efficient, community-based water and wastewater treatment systems for deployment in India (Eco-India), INDIA – EU research project	Department of Science & Technology, Govt. of India in collaboration

		with EU
14	School of Water Resources Engineering has also been entrusted by the National River Conservation Directorate under Ministry of Environment & Forest, Govt. of India for evaluation of DPRs for Projects sponsored by National Ganga River Basin Authority (NGRBA) related to National River Conservation Plan for the eastern and north eastern states	NGRBA, MoEF, Govt. of India
15	Kolkata Metropolitan Development Authority and Kolkata Metropolitan Water & Sanitation Authority have been entrusted to School of Water Resources Engineering for undertaking Third Party Monitoring & Inspection for the project works carried out under National River Conservation Directorate and NGRBA.	KMDA, KMW&SA under NGRBA
16	Hydrodynamic Study for the River Front Development under KMC	Kolkata Municipal Corporation
17	Analysis of sediment transport mechanism in connection to reservoir life and dam safety under “Energy, Environment and Climate Change”	University with Potential for Excellence (UPE) – Phase II” , UGC
18	Hydrogeological Study of Sub-surface Water Flow/Storage Characteristics for Creation of Sustainable Source on Rainfed River for Semi-Arid and Fluoride affected blocks in connection with comprehensive Water Security Plan for Damodar & Kangsabati River under Purulia Districts	PHED, Govt. of West Bengal
19	Indian-European Union Research Project Energy Efficient, community based water and wastewater treatment systems for deployment in India	DST, IMRCD, Govt. of India
20	Indian-European Union Research Project Energy Efficient, community based water and wastewater treatment systems for deployment in India	DST, IMRCD, Govt. of India
21	Appraisal of Sewerage Network of Zone-III of Gangtok town of Sikkim under National River Conservation Plan	NRCD, MoEFCC, Govt. of India

### *B. Consultancy Projects*

<b>Sl. No.</b>	<b>Project Titles</b>	<b>Funding Agency</b>
1	Proof Checking of STP, LS and Sewerage Network for Halisahar & Budge Budge Municipal Town	Simplex Infrastructures Ltd
2	Environmental Impact Assessment for the Proposed Elevated Corridor from E.M. By-Pass to New Town	West Bengal Housing Infrastructure Development Corporation Ltd., Govt. of West Bengal
3	Feasibility Study of Canopy Walk at Sundarban Wild Animal Park, Jharkhali	West Bengal Zoo Authority, Govt. of West Bengal
4	Performance evaluation of Arsenic and Iron Removal Plants (AIRPs)	PHED, Govt. of West Bengal
5	Augmentation of Raw Water of Paddapukur Water Treatment Plant	KMW & SA, Govt. of West Bengal
6	Feasibility Study for Construction of Infiltration Gallery to Draw 12	Public Health

	MLD Water in Darkeswar River at Prakash Ghat in Bishnupur Block of Bankura District	Engineering Dept, Bankura Division, Govt. of West Bengal
7	Feasibility Study for Construction of DTH Tubewell in Raipur Block for Shyamsundarpur, Sonagara and its adjoining areas with respect to availability of Water and its Sustainability of Bankura District	Public Health Engineering Dept, Bankura Division, Govt. of West Bengal
8	Project Benefit Assessment after up-gradation of sewer system (part) in the city of Kolkata under JNNURM	Kolkata Municipal Corporation, Govt. of WB
9	Proof checking of Basic Engineering Package Design and Drawing of 10 MLD and 21 MLD Capacity Sewage Treatment Plant at Bhatpara Municipal Town	Kolkata Metropolitan Development Authority, Govt. of West Bengal
10	Performance Evaluation of seven nos. Sewage Treatment Plant under the control of KMW & SA	KMW & SA, Govt. of West Bengal
11	Appraisal of DPR for Renovation, Rehabilitation & Conservation and Lake Front Development of Motijheel in Motihari Nagar Parishad	NRCD, MoEFCC, Govt. of India
12	Survey and Supervision their plot for River Bank Protection at Uttarpara, Hooghly	Radhu Housing Complex (Pvt.) Ltd.
13	Project Benefit Assessment After Up-Gradation Of Sewer System (Part) In The City Of Kolkata Under JNNURM	Gypsum Structural India Pvt. Ltd
14	Detailed Project Report for Development of Sewerage System in Tarapith Area	WSSO, PHED, Govt. of West Bengal
15	Performance Evaluation of seven nos. Sewage Treatment Plant under the control of KMW & SA	KMW & SA, Govt. of West Bengal
16	Appraisal of DPRs for Zone-I, Zone-II & Zone-III Maheshtala Sewerage Scheme in West Bengal under World Bank assisted NGRBA Projects	
17	Development of Arsenic Removal Unit using Panasonic TiO <sub>2</sub> Photocatalyst and cost Effective Adsorption Media through Experimentation and Validation at Laboratory Scale as well as at the Field Level	Panasonic Pvt. Ltd.
18	Hydrodynamic Study for the River Front Project under JNNURM	Kolkata Metropolitan Development Authority, Govt. of West Bengal
19	Evaluation of Desilting of River Ichamati along International Border with Bangladesh implemented during XI <sup>th</sup> Plan form Bornaberia to BSF Bridge at Kalachi in Gaighata, North 24 Parganas	Irrigation & Waterways Directorate, Govt. of WB
20	Comprehensive Plan of Water Management and Plantation Programme to Project the RCGC as ECO-SYSTEM ICON in Kolkata Metro City	Royal Calcutta Golf Club, Kolkata
21	Hydrological Study including Drilling of Boreholes, Pumping Test (Yield and Recuperation tests) for one cement grinding unit at Parbatpur and Digha villages under Nituria block in Purulia district, West Bengal for proposed Clinker Grinding Unit of 5 MTPA and CPP 20 MW	Shree Cement Limited
22	Faecal Sludge Management: Optimization Of Pit Life Extender	Water For People
23	ETP Adequacy Assessment Report	Krishna Tissues Pvt.



		Ltd.
24	Hydrogeological studies for groundwater development and management strategies in one block each in Kaimur (Adhaura) and Nawada (Meskor) districts, Bihar	Tata Consulting Engineers Limited (TCE), Kolkata
25	Surge Analysis of Clear Water Rising Main from Water Treatment Plant at Jalukbari to Main Reservoir at Kamakhya Hill Top	Dia Consultants & Engineers (P) Ltd.

*Invited lecturers delivered/Sessions chaired (last few years):*

<b>Nature of participation</b>	<b>Name of the Seminar/Conference/Workshop etc.</b>	<b>Place</b>	<b>Duration</b>
Invited speaker	Short term course on Waste to Wealth-The current scenario and sustainable technology- WTW-2020	NIT Durgapur	January 20th to 24th, 2020
Invited speaker	Workshop on Writing Quality Research Article for Publication	Jadavpur University	2 days, January 13 & 14, 2020
Invited speaker	Sustainable Development on Civil Engineering Array	Narula Institute of Technology	January 6th to 11th, 2020
Invited speaker	Workshop on writing patent applications	Jadavpur University	December 16th, 2019
Invited speaker	International seminar on Water Conservation and Sustainable Development- laws, policies, challenges and its global impact	Jyotirmoy School of Law	December 7 <sup>th</sup> to 9 <sup>th</sup> , 2019
Invited speaker	Workshop of the three special reports of IPCC	Biswa Bangla Convention Centre, New Town, Kolkata	November 14 <sup>th</sup> , 2019
Invited speaker	2 <sup>nd</sup> World Congress on Climate Change	Berlin, Germany	4 days, 26-29 <sup>th</sup> September, 2019
Invited speaker	Workshop on Recent Trends on Remediation of Contaminated water and Soil	National Institute of Technology, Durgapur	5 days, 25-29 <sup>th</sup> March, 2019
Invited speaker	International Conference on Hydrogrameen	Satyapriya Roy College of Education	One day, 9 <sup>th</sup> March, 2019
Invited speaker	National Seminar And Workshop On ‘Artificial Intelligence And Machine Learning’	ICARE Complex, Haldia	One day, 2018
Invited speaker	Solid Liquid Waste Management, Characteristics of Water and Sources of Contamination of Water Resources	Kolkata	One day, 13 <sup>th</sup> March, 2018
Invited speaker	Modern Trends in Civil Engineering	Calcutta Institute of Engineering and Management, Kolkata	One day, 23 <sup>rd</sup> February, 2018
Invited speaker	Different Methods of Disinfection and Antibacterial Resistance	School of Water Resources Engineering, JU	One day 20 <sup>th</sup> April, 2018
Invited speaker	International 105 <sup>th</sup> Indian Science Congress Engineering Science Section	Osmania University	2-8 <sup>th</sup> January, 2018
Invited speaker	Refresher Course sponsored by CPHEEO	IPHE, India	14 <sup>th</sup> Feb, 2017
Invited speaker	UGC-Sponsored Refresher Course on Current	School of	13 <sup>th</sup> January,

	Environmental Issues: Impact, Measurement and Mitigation	Environmental Studies, JU	2017
Invited speaker	Seminar on Plumbing Hydraulics	JIS Engineering College	25 and 26 <sup>th</sup> June, 2016
Invited speaker	Society of Civil Engineers, Jadavpur University	Dept. of Civil Engg, JU	10 <sup>th</sup> Sept. 2016
Invited speaker	Seminar for Teachers Up gradation	Techno India College of Technology	19 <sup>th</sup> March, 2016

*Seminar/Workshop/Conference/Symposium attended*

<b>Name of the Seminar</b>	<b>Place</b>	<b>Duration</b>
107th Indian Science Congress	University of Agricultural Sciences, Bangalore	January 3 to 7, 2020
Workshop on Initiatives in Outcome Based Education and NBA Accreditation	Hotel Hyatt	March 6-8, 2017
International Conference on Innovation in Sustainable Water and Wastewater Treatment Systems	YASHDA, Pune	April 21-23, 2016
State Level Workshop on Environmental and Social System Assessment	ISGPP, Govt. of West Bengal	15 <sup>th</sup> December, 2016
1 <sup>st</sup> Regional Science & Technology Congress-2016	DST, Govt. of West Bengal & NITTR, Kolkata	13-14 Nov. 2016
Conference on ASET (ISBN: 978-1-63248-084-2)	Bangkok, Thailand	28-29 December, 2015
Workshop on “Application of Radioisotopes and Radiation Technology in Industry and Healthcare” with BARC and BRNS	IEST, Shibpur	7 October, 2015
National Workshop on Ecosystem Services on River Ganga	NIE, New Delhi	15-16 July, 2014
Training Course on Solid & Liquid Waste Management sponsored by: ISGPP (Panchayat & Rural Development Department, Govt. of West Bengal)	Hotel Sojourn, Salt Lake, Kolkata	9 <sup>th</sup> -13 <sup>th</sup> December, 2013
Training Course on Rainwater Harvesting & Reuse of Water sponsored by Ministry Of Drinking Water & Sanitation, Govt. Of India Jadavpur University, Kolkata	Tripura Institute of Technology (TIT), Agartala	6-10 January, 2014

*Seminar/Workshop/Conference/Symposium organized*

<b>Name of the Seminar</b>	<b>Place</b>	<b>Duration</b>
RUSA 2.0 sponsored One Day Workshop on Issues Related to Water Crisis, Mitigation and Conservation Techniques under Changed Climate Scenario (Mass Awareness Program of Natural Water Conservation through Performing Arts)	Gandhi Bhavan Auditorium Jadavpur University	11 <sup>th</sup> January, 2020
Seminar on Water, Environment, WASH Issues or Managing the cyclone Bulbul/ Natural Disasters	Jadavpur University	November 27 <sup>th</sup> , 2019
UGC Refresher Course on Disaster Management: Water and Environmental Sanitation	School of Water Resources Engineering, Jadavpur University	7-30th January, 2019
Institutional Strengthening of Gram Panchayet Program- II	School of Water Resources Engineering, Jadavpur University	2018
Training Program on “Design on the Components of Water Supply and Sanitation Schemes including Treatment Works”	Anita Banerjee Memorial Hal, JU	24-28 Feb, 2015
Workshop on “Water Safety Plan for Rural Areas”	K.P.Basu Memorial Hall, Jadavpur University	9-10 Mar, 2015
Training Course on Rainwater Harvesting & Reuse of Water Sponsored by: Ministry of Drinking Water & Sanitation, Govt. of India	Tripura Institute of Technology (TIT), Agartala	6-10 January, 2014
Training Course on Solid & Liquid Waste Management Sponsored by: ISGPP (Panchayat & Rural Development Department, Govt. of West Bengal)	Kolkata	9-13 December, 2013

**Declaration:**

I hereby declare that all the statements made in this Resume are true, complete and correct to the best of my knowledge and belief

Date:

Place:

\_\_\_\_\_  
**Signature with Seal**