

## CURRICULUM VITAE OF DR. N.K. GOEL

**Name:** NARENDRA KUMAR GOEL

**Designation:** Professor, Bharat Singh Chair for Water Resources  
Department of Hydrology, IIT Roorkee  
Roorkee- 247667, India  
(Served as Head, Hydrology Department, 2006-08  
Dean of Students' Welfare, IIT Roorkee 2009-11  
& Adjunct Professor, Deptt. of Civil Engineering,  
University of Waterloo, Canada, 2003-2006)



**Date of Birth:** April 24, 1959

**Contact Details:** [goelhy@gmail.com](mailto:goelhy@gmail.com); [goelnfhy@iitr.ernet.in](mailto:goelnfhy@iitr.ernet.in);

Mob. +91-9412393851; tel. +91-1332-285814 (O); +91-1332-285185 (R)

**Marital Status:** Married

### **Educational Qualifications:**

**B.Tech. (Civil -First with honours);** 1980 G.B. Pant Uni. of Ag. & Tech., Pant Nagar  
**M.Tech. (Water Resources Engg.),** 1982 - Indian Institute of Technology Delhi, India  
**Certificate of Hydrology,** 1984 - Colorado State University, U.S.A.  
**Ph.D. (Hydrology),** 1991 – University of Roorkee, Roorkee (Now IIT Roorkee), India

### **Professional Experience: about 31 years.**

**National Institute of Hydrology, Roorkee:** May 1982 – June 1988 as Scientist B and C

#### **Indian Institute of Technology Roorkee :**

June 1988 to April 1996 -Reader ; April 1996-Feb. 2001 -Assoc. Professor  
Feb. 2001 –Professor; Jan. 2012 – Professor (HAG)  
July 2013 onwards – Bharat Singh Chair Professor for Water Resources

### **Administrative Experience:**

**Chief Warden 1995-1998 and 2001-2004; Chief Advisor Sports 2004-2006**  
**Head, Department of Hydrology 2006-2008; Dean of Students' Welfare 2009- 2011**  
**Chairman, Hospital Advisory Committee; Sept. 2012 onwards**

**Areas of Interest:** Stochastic Hydrology, Rainfall runoff modeling, Extreme value estimation, Flood estimation and forecasting

**Awards:** Central Board of Irrigation & Power, 1995 Certificate of Merit Award  
Khosla Research Prize I 1999, 2001, 2002  
Khosla Research Prize II, 2002

**Star performer, IIT Roorkee for 6 years in a row from 2001 onwards**

**Membership:** Member, Expert Committee, Evaluation of mining projects, MoEF, GoI. (2006-08)  
Member, TAC, National Institute of Hydrology, MoWR, GoI, (2009-11)  
Member, Indian National Committee on Hydrology, MoWR, GoI (2009-11)  
Member, Sub-committee on WRD ,Bureau of Indian Standards, GoI ( 2012- Cont.)  
Member, State Expert appraisal Committee, Uttarakhand, MoEF, GoI, (2013-cont.)  
Member, Indian National Committee of International Hydrological Programme, GoI ( 2013- contd)

**Publications :** More than 150 technical papers and reports.

**Theses guided:** Completed M.Tech.- 51, Ph.D. -15 (completed 12, in progress -3)

## LIST OF PUBLICATIONS

### A. BOOK (S):

- Singhal, D.C., **Goel, N.K.**, Srivastava, D.K., Singh, Ranvir, Joshi, H. and Mathur, B.S. (1997), 'Emerging Trends in Hydrology' Edited Proceedings of International Symposium on 'Emerging Trends in Hydrology' Sept. 25-27, 1997, Jain Printers, Roorkee. (Volume I)
- Perumal, M., Singhal, D.C., Arya, D.S., Srivastava, D.K., **Goel, N.K.**, Mathur, B.S., Joshi, H., Singh, R., Nautiyal, M.D. (2005)' Hydrological Perspectives for Sustainable Development', Edited Proceedings of International Conference 'Hydrological Perspectives for Sustainable Development' Feb. 23-25, 2005, Allied Publishers Pvt. Ltd.

### B. TECHNICAL PAPERS:

#### Refereed Journals

- Negash, W., **Goel, N.K.** and Jain, M.K. (2013), 'Temporal and Spatial Variability of Annual and Seasonal Rainfall over Ethiopia', **Hydrological sciences journal**, Vol. 58(2) pp. 1-20, <http://dx.doi.org/10.1080/02626667.2012.754543>.
- Gautam, N.P., Arora, M., **Goel, N.K.** , and Kumar, A.R.S. (2012), ' Investigation of the Impact of Climate Change on Future Runoff of River Satluj', *Journal of Hydrology and Meteorology*, Vol. 8/1 pp. 10-21.
- Kar, A.K., Winn, L.L., Lohani, A.K. and **Goel, N.K.** ( 2012) , 'Soft Computing- Based Workable Flood Forecasting Model for Ayeyarwady River basin of Myanmar', **Journal of Hydrologic Engineering, ASCE**, 17: 807- 822.
- Negash, W., **Goel, N.K.** and Jain, M.K. (2012), 'Investigation of Non-Stationarity in Hydro-climatic Variables at Rift Valley Lakes Basin of Ethiopia', **Journal of Hydrology**, Elsevier ,Vol. 445-445 pp. 113-133.
- Negash, W., Jain, M.K., and **Goel, N.K.** (2012), 'Impact of Climate Change on Runoff Generation: An Application to Rift Valley Lakes Basin of Ethiopia', **Journal of Hydrologic Engineering, ASCE**, 10.1061/(ASCE)HE.1943-5584.0000647 (Jul. 24, 2012).
- Wagesho, N., Jain, M. K. and **Goel, N. K.** (2012),' Assessment of Impact of Terrain, Weather and Catchment input parameters on Runoff Generation in Rift Valley Lakes Basin of Ethiopia', *Water Resources Management Journal*, Ms ID: WARM 2576 (**Paper Under Review**).
- Wagesho, N., Jain, M. K. and **Goel, N. K.** (2012),' Catchment Dynamics and its Impact on Runoff Generation: Coupling Watershed Modelling and Statistical Analysis to Detect Catchment Responses', submitted to *Hydrological Processes*
- Gundekar, H.G., Arya, D.S. and Goel, N.K. (2011), 'Morphometric study of the Dudhana basin (Maharashtra)', **Hydrology journal**, Vo. 34, issue 1 and 2, pp. 33-41.
- Rahman, M. M., **Goel, N.K.**, and Arya, D.S., (2011), 'Development of Jamuneswari Flood Forecasting System –A case study in Bangladesh', **Journal of Hydrologic Engineering, ASCE**, doi:[http://dx.doi.org/10.1061/\(ASCE\)HE.1943-5584.0000565](http://dx.doi.org/10.1061/(ASCE)HE.1943-5584.0000565)

- Kar, A.K., Goel, N.K., Lohani, A.K. and Roy, G.P. ( 2011) , ‘Application of Clustering Techniques Using Prioritised Variables in Regional Flood Frequency Analysis - A Case Study of Mahanadi Basin’, **Journal of Hydrologic Engineering** doi:10.1061/(ASCE)HE.1943-5584.0000417
- Rahman, M. M., Arya, D.S. and **Goel, N.K.** (2011), ‘Rainfall statistics evaluation of ECMWF and TRMM rainfall data over Bangladesh for flood related studies’, *Journal of “**Meteorological Applications**”*, **Wiley InterScience**, published online DOI: 10.1002/met.293.
- Rahman, M. M., **Goel, N.K.**, and Arya, D.S., (2011), ‘‘Study of Early Flood Warning Dissemination System in Bangladesh’’ Submitted in **Journal of Flood Risk Management, Wiley-Blackwell**, (Submission number: JFRM-0007-11, dated: 3 February, 2011, (Under Revision).
- Rahman, M.M. , Arya, D.S. , **Goel, N.K.** and Dhamy, A.P. (2011),’ Design Flow and Stage Computations in the Teesta River, Bangladesh Using Frequency Analysis and MIKE 11 Modeling, **Journal of Hydrologic Engineering, ASCE**, [http://dx.doi.org/10.1061/\(ASCE\)HE.1943-5584.0000299](http://dx.doi.org/10.1061/(ASCE)HE.1943-5584.0000299); Volume 16, Issue 2, pp. 176-186 (February 2011)
- Lohani, A.K., **Goel, N.K.**, and Bhatia, K.K. S. (2011),’ Comparative study of neural network, fuzzy logic and linear transfer function techniques in daily rainfall- runoff modeling under different input domains’, **Hydrological Processes**, Vol. 25, pp. 175-193, Published online 25 August 2010 in Wiley Online Library ([wileyonlinelibrary.com](http://wileyonlinelibrary.com)) DOI: 10.1002/hyp.7831.
- Kar, A.K., Lohani, A.K., **Goel, N.K.** and Roy, G.P. (2010), ‘Development of Flood Forecasting System Using Statistical and ANN Techniques in the Downstream Catchment of Mahanadi Basin, India’, *J. Water Resource and Protection*, 2010, 2, 880-887 doi: 10.4236/jwarp.2010.210105 Published Online October 2010.
- Rahman, M.M. , Arya, D.S. and **Goel, N.K.** (2010),’Limitation of 90 m SRTM DEM in drainage network delineation using D8 method—a case study in flat terrain of Bangladesh’, **Journal of Appl. Geomat.** , Springer, DOI 10.1007/s12518-010-0020-2, published online April 13, 2010, Volume 2, Number 2, 49-58.
- Sarkar, S., **Goel, N.K.**, and Mathur, B.S. (2010) ‘‘Performance investigation of Nakagami-m Distribution to Derive Flood Hydrograph by Genetic Algorithm Optimization Approach’’, **Journal of Hydrologic Engineering**, ASCE, 15(8),658-666.
- Sarkar, S., **Goel, N. K.**, and Mathur, B. S. (2009),’ Development of isopluvial map using L-moment approach for Tehri-Garhwal Himalaya’, **Stoch. Environ. Res. Risk Assess**, Springer, Vol. 24,pp. 411-432
- Sarkar, S., **Goel, N. K.**, and Mathur, B. S. (2009),’Adequacy of Nakagami-m distribution function to derive GIUH’, **Journal of Hydrologic Engineering**, ASCE, 14(10), 1070-1079
- Basistha, A., Arya, D.S., and **Goel, N.K.** (2009), ‘Analysis of historical changes in rainfall in the Indian Himalayas’, **International journal of Climatology**, Doi:10.1002/joc. 1706; Vo. 29/4, pp. 555- 572.
- Basistha, A., Arya, D.S., and **Goel, N.K.** (2008), ‘Spatial distribution of rainfall in Indian Himalayas- a case study of uttarakhand region’, **Water Resources Management**, Vol. 22/10, pp. 1325-1346.

- Arora, M., Singh, P., **Goel, N.K.** and Singh, R.D. (2007), 'Climate variability influences on hydrological response of a large Himalayan basin', **Water Resources Management**, Vol. 22/10, pp. 1461-1475.
- Basistha, A., **Goel, N.K.**, Arya, D.S. and Gangwar, S.K. (2007), 'Spatial Pattern of Trends in Indian Sub-divisional Rainfall', special issue of *Jal Vigyan Samiksha on 'climate change'*.
- Lohani, A.K., **Goel, N.K.**, and Bhatia, K.K. S. (2007), 'Setting up stage-discharge-sediment concentration relationship using fuzzy logic', **Hydrological Sciences journal**, Vol. 52/4, pp. 793-807.
- Goel, N.K.**, Kumar, S., and Gairola, A. (2006), 'Extreme wind quantile estimation using a pooled frequency analysis approach', **Journal of Wind Engineering**, Vol. 3/1, pp. 48-65.
- Lohani, A.K., **Goel, N.K.**, and Bhatia, K.K. S. (2006), 'Takagi-Sugeno fuzzy inference system for modeling stage-discharge relationship', **Journal of Hydrology**, Vol. 131/1-2, pp. 146-160.
- Singh, P., Arora, M. and **Goel, N.K.** (2006), 'Effect of climate change on runoff of a glacierized Himalayan basin', **Hydrological Processes Journal**, vol. 20.
- Arora, M., Singh, P., Goel, N.K. and Singh, R.D. (2006), 'Spatial Distribution and Seasonal Variability of Rainfall in a Mountainous Basin in the Himalayan Region', **Water Resources management**, Vol. 20/4, pp. 489-508.
- Arora, M., **Goel, N.K.** and Singh, P. (2005), 'Evaluation of temperature trends over India', **Hydrological Sciences journal**, Vol. 50/1, pp. 81-93.
- Bhatt, V.K., **Goel, N.K.** and Mathur, B.S. (2004), 'Regional flood frequency analysis using artificial neural network', *Indian Journal of Soil Conservation*, Vol. 32(3) pp 178-183.
- Goel, N.K.**, Burn, D.H., Pandey, M.D. and Ying An (2004), 'Wind quantile estimation using a pooled frequency analysis approach', **Journal of Wind Engineering and Industrial Aerodynamics**, Vol. 92/6, pp. 509-528.
- Arora, M., **Goel, N.K.**, Singh, P. and Singh R.D. (2004), 'Regional flow duration curve for a Himalayan River basin in India' **Nordic Hydrology**, Vol. 36/2, pp. 193-206
- Jaiswal, R.K., **Goel, N.K.**, Singh, P., and Thomas, T. (2003), 'L- moment based flood frequency modelling', *Institution of Engineers India Journal- CV*, vol. 84, p. 6-10.
- Zhou, Gangyan, **Goel, N.K.** and Bhatt, V.K. (2002), 'Stochastic modelling of sediment load of upper Yangtze river (China)', **Hydrological Sciences Journal**, Vol. 47s, p. s93-s105.
- Thomas, T, Singh, P., **Goel, N.K.** and Jaiswal, R.K. (2002), 'Snowmelt runoff modeling in Bease river basin', *Institution of Engineers India journal- CV*, Vol. 83, p. 146-148.
- Burn, D.H. and **Goel, N.K.** (2001), 'Flood frequency analysis for Red River at Winnipeg', **Canadian Journal of Civil Engineering**, Vol. 28, pp. 355-362.
- Goel, N.K., Burn, D.H. and Chander, S. (2001), 'Regionalisation of hydrological parameters', **Hydrology Journal of IAH**, Vol. 24(3), pp. 25-32.
- Jaiswal, R.K., **Goel, N.K.**, Singh, P. Seth, S.M. and Thomas, T. (2001), 'Flood frequency modeling for Beas basin', **Hydrology Journal of IAH**, Vol. 24(2), pp. 21-34.
- Kurothe, R.S., **Goel, N.K.** and Mathur, B.S. (2001), 'Derivation of curve number and kinematic wave based flood frequency distribution', **Hydrological Sciences Journal**, Vol. 46(4), pp. 571-584.

- Mishra, S.K., Seth, S.M., Srivastava, D.K. and Goel, N.K. (2001), 'Derivation of operation policies for the multipurpose Ramganga reservoir (India)', **Water and Energy International**, Vol. 58/1 pp. 26-40.
- Goel, N.K.** and Burn, D.H. and Jigajinni, R.B. (2001), 'Frequency analysis of a non-stationary flood series.', **Journal of Hydrology** (Communicated )
- Thomas, T., Singh, P., **Goel, N.K.**, Seth, S.M. and Jaiswal, R.K. (2000), 'Hydrologic modeling of a snowfed river basin', **Hydrology Journal of IAH**, Vo. 23(1-4), pp. 1-11.
- Goel, N.K.**, Kurothe, R.S., Mathur, B.S. and Vogel, R.M. (2000), 'A derived flood frequency distribution for correlated rainfall intensity and duration', *Journal of Hydrology*, Vol. 228, pp. 56-67.
- Burn, D.H. and **Goel, N.K.** (2000), 'The formation of groups for regional flood frequency analysis', **Hydrological Sciences Journal**, Vol. 45(1), pp. 97-112. (paper won Khosla Research Prize 2001)
- Fikru Gemtech, Arya, D.S. and **Goel, N.K.** (2000), 'Streamflow forecasting using artificial neural network', **Water and Energy International** , Vol. 57 (1), pp. 30 -37.
- Goel, N.K.**, Seth, S.M. and Chandra Satish (1998), 'Multivariate modelling of flood flows', *ASCE, Journal of Hydraulic Engineering*, Vol. 124/2, pp. 146-155. ( Paper won Khosla Research Prize 1999)
- Goel, N.K.** and Seth, S.M. (1998), 'Probabilistic modelling of flood characteristics of a large elongated basin', *Water and Energy International*, Vol. 55/3 pp. 23-31.
- Goel, N.K.** and Banerjee, S. (1998), 'Performance evaluation of flood quantile estimators on flood like Wakeby parents', *Water and Energy International* , Vol. 55/4, pp. 53-63.
- Kurothe, R.S., **Goel, N.K.** and Mathur, B.S. (1997), 'Derived flood frequency Distribution for negatively correlated rainfall intensity and duration', *Water Resources Research*, Vol. 33, pp. 2103-2107.
- Goel, N.K.**, Lone, M.A. and Mathur, B.S. (1997), 'Regional flood frequency analysis for Jhelum river basin', *Journal of Institution of Engineers (India)*, Vol.78, pp.38-41
- Mehrotra, R., **Goel, N. K.** and Singh, R. (1994), 'Monthly streamflow generation using condensed disaggregation model, *Hydrology Journal of IAH*, Vol.XVII/1-2.
- Goel, N.K.** and De, M. (1993), 'Development of unbiased plotting position formula for General Extreme value distribution', *Journal of Stochastic Hydrology and Hydraulics* , Vol.7/1, pp. 1-7.
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- Goel, N.K.** and Seth, S.M. (1989), 'Studies on plotting position formula for Gumbel Distribution', *Journal of the Institution of Engineers (India)*, Vol.70, part CV4.
- Goel, N.K.**, Bhatia, K.K.S. and Seth, S.M. (1984), 'Application of Thomas Fiering model for monthly streamflow generation in Chaliyar river basin', *Hydrology Journal of IAH*, Vol.VII/1.

#### **Seminar and Symposia:**

- Goel, N.K., Karki, B., Kar, A.K., and Arya, D.S. (2012), 'Development of regional flood frequency relationships for Nepal using SRTM data enabled attributes and clustering' accepted for

- publication in 10<sup>th</sup> International Conference on Hydroinformatics, HIC 2012, Hamburg, Germany July 14-18, 2012.
- Arya, D.S., Kabuya, P.M., Murumkar, A.R., Rahman, M.M., and Goel, N.K. (2012), 'Impact of Climate Change on Rainfall Pattern in Jamuneshwari River Basin, Bangladesh', accepted for publication in 10<sup>th</sup> International Conference on Hydroinformatics, HIC 2012, Hamburg, Germany July 14-18, 2012.
- Goel, N.K., Rahman, M. M, and Arya, D.S. (2011), "Recent Advances in Early Flood Warning Systems - A Conceptual Framework for Jamuneshwari River Basin, Bangladesh", **ASCE Conference in Singapore**, 4-6 January, 2011.
- Arya, D. S., Kabuya, P. M., Rahman, M.M. and N. K. Goel, (2011), "Projection of Climate Change Impact on Flooding in Bangladesh", **ASCE Conference in Singapore**, 4-6 January, 2011.
- Kar, A.K., Lohani, A.K., **Goel, N.K.**, and Roy, G.P.(2010) "Development of fuzzy flood forecasting model for downstream of Hirakud reservoir of Mahanadi basin, India", International Workshop on River Management (IWRM 2010),14-16 Dec. New Delhi.
- Rahman, M. M., Goel, N.K. and Arya, D.S., (2010), "Advancement of Flood Forecasting and Warning System in Bangladesh for Risk Management - Present and Future", The 3rd **International ASCE Conference** on Current & Future State of Water Resources and Environment (EWRI-IITM 2010), January 5-7, 2010, Chennai.
- Kar, A.K., Lohani, A.K., **Goel, N.K.**, and Roy, G.P. (2010) "The changing climate of Mahanadi basin", Second International conference on Climate Change and Sustainable Management of Natural Resources (TIMS10),December 5-7 at IITM , ITM Universe, Gwalior.
- Sathish Kumar, D. , Adam, E. E., Arya, D.S. and **Goel, N.K.** ( 2009) 'Urban Flood Risk Assessment and Mitigation' , presented in conference on Research Activities in Disaster Mitigation for Housing in India, August 22-23, 2009, Roorkee, India.
- Chakraborty, D., Goel, N.K., Arya, D.S., Gairola, A. (2009), 'Flood estimation in Mumbai metropolitan region using regional flood frequency analysis', presented in conference on Research Activities in Disaster Mitigation for Housing in India, August 22-23, 2009, Roorkee, India.
- Agarwal, N., Arora, M., **Goel, N.K.**, and Arya, D.S. (2009), ' Estimation of snow cover area in Bhagirathi catchment upto Tehri dam site', proceedings of national seminar on ' Hydro power stations- advancement in harnessing & up-keeping' , organized by National Power Training Institute, Durgapur, July 2-3, 2009 at Dehradun
- Gundekar, H. G., Arya, D. S., **Goel, N. K.** , Sarkar, S. and Sethi, B. K. (2009). "Socio-Economic Inference of Floods in Last Decades". International Conference on Water, Environment, Energy and Society (WEES-2009) Organised by National Institute of Hydrology, Roorkee, Allied Publishers Pvt. Ltd., New Delhi, India, Vol-III, pp. 1496-1503
- Rahman, M. M., Arya, D.S. and Goel, N.K., (2008), "Approach of Early Flood Warning System for Urban Flood Risk Mitigation", **International Conference on Disaster and Development – Bridging the gap between theory and practice (ICODAD 2008)**, Kathmandu, Nepal, Nov. 2008.
- Lone, M.A., and **Goel, N.K.** ( 2007), ' Estimation of floods for some important sites of Jhelum river basin, using statistical approach', Proceedings of HYDRO 2007, National conference on Hydraulics and Water Resources, NIT Surat, Dec. 21-22, 2007.

- Goel, N.K.**, Gauchan, B., and Arya, D.S. (2006), 'Flood quantile estimation for Narayani river system of Nepal using pooled flood frequency analysis approach', proceedings of 7<sup>th</sup> International conference on Hydroinformatics, Nice, France, Sept. 4-6, 2006.
- Arya, D.S. Gauchan, B., and (2006), **Goel, N.K.**( 2006), 'Flood Plain Mapping For East Rapti River, Nepal Using GIS and HEC-RAS ', proceedings of 7<sup>th</sup> International conference on Hydroinformatics, Nice, France, Sept. 4-6, 2006.
- Goel, N.K.**, Than, H.H. and Arya, D.S. (2005), 'Flood risk mapping in the lower part of Chindwin river basin (Myanmar)' Proceedings of International Conference on **Flood Forecasting Technology**, Tromso, Norway, Oct. 17 to 19, 2005.
- Lohani, A.K., **Goel, N.K.**, Bhatia, K.K.S. (2005), 'Development of fuzzy logic based real time flood forecasting system for river Narmada in central India', Proceedings of International Conference on **Flood Forecasting Technology**, Tromso, Norway, Oct. 17 to 19, 2005.
- Lohani, A.K., **Goel, N.K.**, and Bhatia, K.K.S. (2005), 'Real time flood forecasting using fuzzy logic' Proceeding of International conference 'Hydrological Perspectives for Sustainable Development- HYPESD -2005' Roorkee, Feb. 23-25, 2005.
- Bhatt, V.K., **Goel, N.K.**, and Mathur B.S. (2005), 'Cluster formation for regional homogeneity using fuzzy k-means' Proceeding of International conference 'Hydrological Perspectives for Sustainable Development- HYPESD -2005' Roorkee, Feb. 23-25, 2005.
- Arora, M. Singh, P., **Goel, N.K.**, and Singh, R.D. (2005), 'Effect of climate change on flow regime of glacierized Himalayan basin' Proceeding of International conference 'Hydrological Perspectives for Sustainable Development- HYPESD -2005' Roorkee, Feb. 23-25, 2005.
- Goel, N.K.**, Shiv Kumar, Gairola, A. (2004), 'Extreme wind quantile estimation for India using a pooled frequency analysis approach', proceedings of International workshop on Wind Engineering and Science WES-04, New Delhi, Oct. 29-30, 2004.
- Arora, M., Singh, P. and **Goel, N. K.** (2003), 'Evaluation of climate change on rainfall, discharge and temperature for a Himalayan basin', Proceedings of International conference on Water and Environment ( WE-2003), Bhopal, Dec. 15-18, 2003.
- Deshpande, S.M. and **Goel, N.K.** (2003), 'optimization of groundwater level monitoring network, Aurangabad ( India)', Proceedings of International conference on Water and Environment ( WE-2003), Bhopal, Dec. 15-18, 2003.
- Zhou, Gangyan, **Goel, N.K.** and Bhatt, V.K. (2000), 'Stochastic modelling of sediment load of upper Yangtze river (China)', International Conference on Integrated Water Resources Management for Sustainable Development, December 19-21, 2000, Roorkee.
- Goel, N.K.** (1998), 'Flood estimation in sub Himalayan region using L moments', International Symposium on ' Hydrology of ungauged streams in Hilly regions for small hydro power development', New Delhi, March 9-10, 1998.
- Mishra, S.K. , **Goel, N.K.**, Seth, S.M. and Srivastava, D.K. (1998), 'An SCS- CN based long term daily flow simulation model for a hilly catchment', International Symposium on ' Hydrology of ungauged streams in Hilly regions for small hydro power development', New Delhi, March 9-10, 1998.
- Goel, N.K.** and Seth, S.M. (1997), 'Probabilistic modelling of peak, volume and duration characteristics of flood flows', Proceedings of International Symposium on Emerging Trends in Hydrology, Roorkee, Sept. 25-27, 1997.

- Lone, M.A., **Goel, N.K.** and Mathur, B.S.(1996),' Performance of various flood estimation methods for Jhelum river basin', Proceedings of International Conference on 'Disasters and Mitigation' held at Madras (India), Jan. 19-22, 1996.
- Goel, N.K.** (1995),' Hydrological hazards- prevention and mitigation' Workshop on ' Strengthening of community participation in disaster reduction and role of NGO's' Vigyan Bhawan, New Delhi, Jan. 13-15, 1995.
- Goel, N. K.**, Sinha, L. P. and Kashyap, D. (1995),' Flood hydrograph computation using Green and Ampt model', proceeding of National Symposium on 'Hydrology of Arid and Semi arid Regions' Jaipur, Oct. 5-7, 1995.
- Banerjee, Satyabrata and **Goel, N.K.** (1995),' A performance study of flood quantile estimators on flood like Wakeby parents', Diamond Jubilee Research and Development Session of C.B.I & P., New Delhi, Oct. 9-12, 1995.
- Lone, M.A., **Goel, N.K.** and Mathur, B.S. (1995),' Methods based on standardised probability weighted moments for estimation of flood frequency parameters - (a case study)', Diamond Jubilee Research and Development Session of C.B.I & P., New Delhi, Oct. 9-12, 1995.
- Goel, N.K.**, Karim A.Q. and Patanaik, L.M. (1993), 'Development of improved SCS method for flood hydrograph computation', Proceedings of National Seminar on 'Hydrological Hazards- Prevention and Mitigation', Roorkee, March 17- 18, 1993.
- Mathur, B.S., Singh, R., **Goel, N.K.**, Tiwari, A.K. and Kurothe, R.S. (1993), 'Rainfall runoff erosion modelling for Indian watersheds', Proceedings of National Seminar on 'Hydrological Hazards- Prevention and Mitigation', Roorkee, March 17-18, 1993.
- Goel, N.K.**, Mathur, B.S. and Lone, M.A. (1989), 'Flood estimation in Kashmir valley using regional flood frequency analysis approach', Proceedings of National Seminar on 'Hydrology', Jammu, Jan.4-5, 1989.
- Mathur, B.S. and **Goel, N.K.** (1989), 'Was July 5, 1988 storm at Roorkee an unusual one?', Proceedings of regional workshop on 'Unusual storm events and their relevance to dam safety' Narmadasagar dam site, Sept. 1989.
- Goel, N.K.** and Seth, S.M. (1988), 'Comments on Evaluating flood retarding structures by W.F. Rogers and V.P. Singh (Advances in Water Resources, 1986, Vol. 9/4)' Published as letter to the Editor, Advances in Water Resources, Vol.II, pp.48.
- Goel, N.K.** and Seth, S.M. (1988), 'Comparative study of different parameter estimation techniques for EV1 distribution', Proceedings of International Seminar on 'Hydrology of Extremes', Roorkee, Dec.1-3, 1988.
- Goel, N.K.**, Seth, S.M. and Chandra Satish (1987), 'Design flood estimation of Narmada Sagar project using partial duration series - a case study', in V.P.Singh (editor), 'Application of frequency and risk analysis in water resources' Reidel, Dordrech, pp.113-122.
- Goel, N.K.** (1985), 'Outliers in flood frequency analysis' Proceedings of National Seminar on water Resources Development - Role of Proper Investigation', Jabalpur, Sept.1-3, 1985.
- Goel, N.K.** and Seth, S.M. (1985), 'Data related problems in frequency analysis' Proceedings of National Seminar on 'Flood Frequency Analysis', New Delhi, Sept. 30, 1985.
- Seth, S.M. and **Goel, N.K.** (1985), 'Regional flood frequency analysis' Proceedings of National Seminar on 'Flood Frequency Analysis', New Delhi, Sept. 30, 1985.



**Goel, N.K.** and Seth, S.M. (1985), 'Tentative spillway design flood estimation for Narmada Sagar Project', Proceedings of National Seminar on 'Flood Frequency Analysis', New Delhi, Sept.30, 1985.

**Goel, N.K.** and Chander, S. (1984), 'Flood stage forecasting using ARMAX models', Proceedings of National Seminar on 'Real Time Forecasting', New Delhi, Oct. 31, 1984.

Soni, B., **Goel, N.K.** and Singh, J. (1984), 'Probable rainfall for integrated planning - a mixed distribution approach', Proceedings of National Seminar on 'Hydrology', Poona, June 29 to July 7, 1984.

**C. Ph.D. THESES GUIDED:**

1. Development of physically based flood frequency models by Mr. R.S.Kurothe supervised jointly with Dr. B.S. Mathur ( awarded)
2. Operation of a multipurpose reservoir by Mr. S.K. Mishra jointly with Dr. S. M. Seth and Dr D.K. Srivastava (awarded)
3. Estimation of extreme flows for ungauged catchments by Mr. V. K. Bhatt - supervised jointly with Dr. B.S. Mathur ( awarded)
4. Effect of climatic changes on surface hydrological estimates by Mr. Manohar Arora – supervised jointly with Dr. Pratap Singh ( awarded)
5. ANN and fuzzy logic in hydrologic modeling and flow forecasting by A. K. Lohani, supervised jointly with Dr. K.K.S. Bhatia (awarded)
6. Regional flood frequency estimation in India by Rakesh Kumar, supervised jointly with Dr. K.K.S. Bhatia ( awarded)
7. Climate change studies: A spatio- temporal analysis for part of India by Ashoke Basistha jointly with Dr. D.S. Arya ( awarded)
8. Hydrological modeling for flood flows by Mr. Shibayan Sarkar jointly with Dr. B.S. Mathur (awarded)
9. Evaluation of temporal and spatial climatic variability over Indian Himalaya by S.K. Shrivastava, supervising jointly with Dr. Ranvir Singh and Dr. Pratap Singh (Awarded)
10. Flood forecasting and early warning studies for parts of Bangladesh by Mizanur Rahman from Bangladesh jointly with Dr. D.S. Arya (Awarded)
11. Flood estimation and forecasting in Mahanadi river basin using soft computing techniques by Anil Kar jointly with A.K. Lohani ( Awarded)
12. Impact of Climate and catchment dynamics on runoff generation by Negash Wagesho from Ethiopia jointly with Dr. M.K. Jain ( Awarded)
13. Development of a operational flood forecasting system for Tehri dam by Niraj Kumar Agrawal ( in progress)
14. Hydrological design practices under Climate change by Vipin Saklani (( in progress)
15. Impact of Climate change on flood estimates by Litan Kumar Ray ( in progress)

**D. M.E. THESES GUIDED:**

1. Flood estimation in river Jhelum basin using statistical approach by M.A. Lone, (1988-89) jointly with Dr. B.S.Mathur
2. Comparison of monthly streamflow models by Rajeshwar Mehrotra (1988-89).
3. Regional flood frequency analysis of Mekong river basin, Laos by Panyasiri Sang from Lao PDR (1988-89).
4. A comparative study of regional flood frequency methods by James U. Ikoi from Nigeria (1989-90).

5. Hydrological studies for Manibhadra Dam project by J.K.Rath (1989-90).
6. Studies on general extreme value distribution by Manik De (1990-91).
7. Derivation of Nash model parameters from geomorphological instantaneous unit hydrograph by R.K. Panigrahi (1991-92) jointly with Mr. R.D.Singh
8. Flood frequency analysis using two step power transformation by Satyabrata Banerjee (1991-92).
9. Flood forecasting using geomorphological instantaneous unit hydrograph by Abdul Qayyum Karim from Afghanistan, (1992-93).
10. Development of daily rainfall generation model by Vu Hong Chau from Vietnam, (1993-94).
11. Rainfall runoff modelling by Adil Yassin Mohamed from Sudan, (1993-94), jointly with Mr. R.D. Singh.
12. Analysis of daily rainfall and runoff data of Serang river basin, Indonesia by Sutjipto from Indonesia,(1993-94).
13. Regional flood frequency analysis for Central India by Jyoti Prasad (1994-95).
14. Richard's equation assisted flood hydrograph computation by kinematic wave approach by Manoj Kumar Singh (1995-96) jointly with Dr. Deepak Kashyap
15. Flood frequency studies using L-moments by Bhopal Singh (1995-96)
16. Event based rainfall runoff modelling using geomorphological characteristics by M.K. Sharma (1996-97) jointly with Mr. R. D. Singh
17. Analysis of hydro-meteorological data by A.K. Diwvedi (1996-97) jointly with Mr. Hemant Chaudhary
18. Stochastic modelling of ground water levels by A.K. Agarwal (1997-98) jointly with Dr. D.C. Singhal
19. Flood frequency analysis for ungauged sites of central India by Jemal Reshid Shafi from Ethiopia (1997-98)
20. Frequency analysis of censored data by Aberra Chala Buba from Ethiopia (1998-99) jointly with Dr. D.K. Srivastava
21. Streamflow forecasting using ANN by Fikru Gemtecha from Ethiopia (1998-99) jointly with Dr. D.S. Arya
22. Hydrologic modelling of snow fed river basin by T. Thomas ( 1999-2000) jointly with Dr. S.M. Seth and Dr. Pratap Singh
23. Flood Frequency modelling for Beas basin upto Pandoh by R.K. Jaiswal ( 1999-2000) jointly with Dr. S.M. Seth and Dr. Pratap Singh
24. Streamflow forecasting using linear perturbation model & ANN approach by N. Vivekanandan ( 1999-2000) jointly with Dr. D.S. Arya
25. Flood estimation for Bagamati river at Pandhera Dhoban, Nepal by L.D. Shrestha from Nepal (1999-2000) jointly with Dr. B.S. Mathur
26. Estimation of flood quantiles from non stationary flood series by R.B. Jigajinni (2000-2001)
27. Stochastic analysis of high frequency ground water data by S.M. Deshpande (2001-2002)
28. Stochastic analysis of daily rainfall data between Bargi and Hoshangabad by Y.K. Dhama (2002-2003) jointly with Dr. K.S. Ramasastri
29. A critical appraisal of flood forecasting models by G.B. Pattnaik ( 2003-04) jointly with M.Perumal
30. Extreme value estimation for hydro-meteorological data by Shiv Kumar (2003-04)
31. Water availability aspect of Interbasin water transfer by Goutam Chandra Das (2003-04) jointly with B.S. Mathur
32. Temporal and spatial analysis of rainfall in Uttaranchal (2003-04) by Ashok Basistha jointly with D.S. Arya

33. Flood hazard Assessment of Chitwan District in Nepal (2004-05) by Bhupendra Gauchan from Nepal jointly with Dr. D.S. Arya
34. Flood risk mapping in the lower part of Chindwin river in Myanmar (2004-05) by Htay Htay Than from Myanmar, jointly with Dr. D. S. Arya
35. Climate change influences on hydrological extremes (2005-06) by S.K. Gangwar jointly with Dr. D.S. Arya
36. Flood risk mapping by Dhruv Dharendra (2005-06) jointly with Dr. D.S. Arya
37. Predictions in ungauged basins of Orissa (2007-08) , A.K. Kar
38. Flood predictions in MMRDA region, Mumbai (2007-08), D. Chakravorty
39. Stochastic modeling of Nile Flows (2007-08) by Eltag from Ethiopia
40. Design flood and Scour depth computation at pipeline crossing (2008-09) , Ekta Sahay jointly with Dr. D.S. Arya and Dr. Sanjay Kumar
41. Modelling of snow melt component in the runoff of river Bhagirathi at Tehri (2008-09), Neeraj Agarwal, jointly with Dr. D.S. arya and Dr. Manohar Arora
42. Regional flood frequency analysis of Nepal rivers (2009-10) , Badri Karki from Nepal
43. Stochastic modeling of flood flows for Myanmar rivers (2009-10) by Lai Lai Winn from Myanmar jointly with Dr. A.K. Lohani
44. Climate change scenario generation using statistical downscaling (2009-10) by. N.P. Gautam from Nepal jointly with Dr. Manohar Arora
45. Bivariate Flood frequency analysis using Copulas (2009-10) by Siddartha Shankar Mishra, jointly with Dr. Aditi Gangopadhyay
46. Hydrological analysis for a coastal power project (2010-11) – Keshav Bobade
47. Hydrological reappraisal for Visnugad pipalkoti hydro-electric project by Sushil Himanshu 2011-12
48. Design flood estimation for Tehri dam using deterministic and statistical approaches by Ajay Kumar, 2011-12
49. Flood estimation and forecasting studies for Tehri dam – Mr. Ashish Sinha 2012-13
50. Flood routing studies for VPHE project, Uttarakhand by Mr. Sujay Negi 2012-13
51. Simplified flood routing methods- Mr. M.M. Vishnu 2012-13
52. Flood estimation for Kalpasar project by Miss Priyanka 2013-14 (in progress)
53. Flood estimation for Narmada and Mahi basins, Gujarat by Sunil Kumar, 2013-14 (in progress)
54. Development of flood forecasting model for Tehri dam, by Supindra Khatri 2013-14 (in progress)
55. Water availability and flood estimation studies for VPHE project by Mr. Y.K. Goel 2013-14 (in progress)

## **E. TECHNICAL REPORTS**

- Goel, N.K.** and Chander, S.(2002), 'Regionalisation of hydrological parameters', Indian National Committee on Hydrology report no. INCOH/SAR- 24/2002, INCOH secretariat, National Institute of Hydrology, 101 p.
- Goel, N.K.** (1988), 'Forecasting of monsoon runoff using data from specific basins', National Institute of Hydrology Technical Report no.TR-43.
- Seth, S.M. and **Goel, N.K.** (1987), 'Comparative study of different parameter estimation techniques for EV-I distribution', National Institute of Hydrology Technical Report no. TR-36.
- Goel, N.K.** (1986), 'Simple technique for forecasting of monsoon rainfall and runoff and application to Mahanadi river at Hirakud', National Institute of Hydrology Technical Report no.TR-17.

- Seth, S.M., **Goel, N.K.** and Nirupma, P. (1987), 'Application of bivariate Thomas Fiering model for monthly streamflow generation in Mahanadi river basin', National Institute of Hydrology Technical Report no. CS-19.
- Seth, S.M. and **Goel, N.K.** (1986), 'Some studies on plotting position formulae for Gumbel EV- 1 distribution', National Institute of Hydrology Technical Report no. TR-9.
- Seth, S.M. and **Goel, N.K.** (1986), 'Techniques for flood frequency analysis', National Institute of Hydrology Technical Report no. UM-24.
- Seth, S.M. and **Goel, N.K.** (1985), 'Partial duration series models', National Institute of Hydrology Technical Report no. CS-II.
- Seth, S.M. and **Goel, N.K.** (1985), 'Time series analysis models', National Institute of Hydrology Technical Report no. RN-18.
- Seth, S.M. and **Goel, N.K.** (1985), 'Flood forecasting models', National Institute of Hydrology Technical Report no. RN-35.
- Goel, N.K.** (1984), 'Time series analysis', National Institute of Hydrology Technical Report no. IND/74/045.
- Seth, S.M. and Goel, N.K (1984), 'Frequency analysis', National Institute of Hydrology Technical Report no. UM-2.
- Seth, S.M., **Goel, N.K.** and Bhatia K.K.S. (1984), 'Monthly streamflow generation', National Institute of Hydrology Technical Report no. CS-8.
- Seth, S.M. and **Goel, N.K.** (1984), 'Partial duration series models', National Institute of Hydrology Technical Report no. RN-5.
- Seth, S.M., Perumal, M. and **Goel, N.K.** (1983), 'Development and application of programme on power transformation method to flood frequency analysis - A comparative study with other normalization procedures', National Institute of Hydrology Technical Report.

#### **F. CONSULTANCY PROJECTS:**

1. Estimation of PMF, design flood including determining spillway capacity for Gulf of Khambat development Project- Kalpasar project', sponsored by Kalpasar Department, 62.8 lakhs, 2012-13
2. Development of operational flood forecasting system for Tehri dam, sponsored by THDC Ltd. 49.6 lakhs, 2011-12
3. Hydrology and power potential studies for Vishnugad Pipalkoti HEP, sponsored by THDC Ltd. 13.23 lakhs, 2011-12
4. Review of reports and drawings of dump sites for Chenani- Nashri tunnel J&K, sponsored by Leighton Contractors India Pvt. Ltd. and NHAI amount Rs. 30.4 lakhs, 2012-13
5. Hydrological Assessment for Chenani- Nashri tunnel area, sponsored by Leighton Contractors India Pvt. Ltd. and NHAI amount Rs. 11.47 lakhs, 2011-12
6. Hydrological study near Shamsabad area by GMR, Year 2010-11, Amount Rs.16.7 lacs
7. GLOF studies for two sub-basins in Twang basin, Arunachal Pradesh, Sponsored by SEW Infrastructure, Hyderabad. Rs. 15.6 lakhs, 2011-13
8. Data validation for SEW project sites, Sponsored by SEW Infrastructure, Hyderabad. Rs. 5.0 lakhs, 2011-12
9. Velocity and Cross Section Measurements of Chilla Canal, sponsored by DLZ Power Pvt. Ltd., Pune, 2009-10, Rs. 5.6 lakhs
10. Meandering behavior of river Ramganga and Ganga near Farrukhabad, Sponsored by GAIL (india), limited, Rs. 21 lakhs – year 2009-10
11. Processing and verification of discharge data of river Tamaklata and Alaknada, sponsored by R.K. Engineering, Roorkee, Rs. 5.5 lakhs, year 2009-10

12. Ground water coloration studies near Shabajpur village, sponsored by Jubilant Organosys, Gajraula, 5.5lacs - year 2010
13. Ground water coloration studies near Shabajpur village, sponsored by Jubilant Organosys, Gajraula, 6.7 lacs - year 2009
14. Series extension and design energy computations for Tehri dam, sponsored by THDC Ltd., 2.2 lacks – year 2009-10
15. Study and Analysis of observed data of Suketi Khad, Kansa Khad and River Beas Sponsored by Bhakra Beas Management Board, Year 2008-09, Amount Rs. 7.86 lacks
16. Hydrological Survey at Koteswar Power Station – Water Supply and Geophysical Investigations Sponsored by Power Grid Corporation of India, Year 2008-09, Amount Rs. 2.25 lacks
17. Review of Gomti Nagar (extension) Drainage Design Sponsored by Lucknow Development Authority, Year 2008-09, Amount Rs. 6.75 lacks
18. Review of Hydrological Aspects of TATO – II and SIYOM HE-Project Sponsored by Reliance, Year 2008-09, Amount Rs. 6.75 lacks
19. Reconnaissance Study Around GHIAL Sponsored by GMR, Year 2008-09, Amount Rs.1.12 lacs
20. Hydrological Studies at Cuttack, Orissa, Sponsored by M/S WAPCOS, Year 2008-09, Amount Rs. 5.05 lacs
21. River Migration Studies, Design Flood Studies, Sponsored by L&T, Year 2008-09, Amount Rs. 29 lacs
22. Review of Hydrology of Tehri dam, sponsored by THDC, Year 2008-09, Amount Rs. 4.5 lacks
23. Urban drainage design for Jaipur city, sponsored by Jaipur Development Authority, Year 2008-09, Amount 7.86 lacs
24. Evaluation Study of completed Research schemes under the R&D Programme of MOWR, sponsored by Ministry of Water Resources, New Delhi, year 2006-07, amount Rs. 13.5 lakhs
25. Hydrological study for Song dam, Amount Rs. 1.0 lacks
26. State level master plan for SHP Potential sites in Chhattisgarh, Contributing as member of study team
27. Evaluation of PFR of SHP projects in Uttaranchal, Contributing as member of study team
28. Strengthening Disaster Mitigation and Management at State level in India, contributed as member of study group formed by Asian Disaster Preparedness Center, ( Flood Plans for UP)
29. Regional flow regimes estimation for small scale hydropower assessment ( REFRESHA) contributing as member of study group
30. External Drainage Design for Kosi Kotwan Industrial Estate of UPSIDC contributing as member of study group
31. Preparation of detailed project for the conservation and management of Dal - Nagin lake in Srinagar (J &K) contributing as member of study group
32. External drainage design for TRONICA city, UPSIDC project, contributing as member of study group ( 1998)
33. Testing of pan Evaporimeters (1998), M/s Delite Engineering Works, Roorkee.
34. Hydrology study for integrated steel plant, Satarda, Usha Ispat Ltd. (1997) contributed as member of study group
35. Development of hydrological watershed simulation model (phase-I) Review and recommended approach, Ministry of Agriculture, New Delhi, (1992).

36. Design flood estimation for Kishau dam, National Institute of Hydrology (1989), contributed as member of study group.
37. Water availability studies for Mahanadi river basin at three sites, National Institute of Hydrology (1986), contributed as member of study group.
38. Design flood estimation for Narmada sagar and Sardar Sarovar Project, National Institute of Hydrology (1985), Contributed as member of study group.

#### **G. SPONSORED RESEARCH PROJECTS**

- Inventorization of Industries using web and GIS based techniques for Bhagwanpur, Laksar and Roshnabad Industrial Estates in Hardwar and Udham Singh Nagar District., sponsored by UCoST, Uttarakhand
- Development of Dynamic Flood frequency models- sponsored by Min. of Water Resources Rs. 3.60 lakhs (Completed)
- Meteorological Data Collection, Monitoring, Processing and Analysis to Evaluate Climate Variability in the State of Uttaranchal under U-PROBE sponsored by Department of Science and Technology, Government of India Amount Rs. 23.5 lakhs ( completed)
- Development of spatial water and climate information system for the state of Uttaranchal under U-PROBE sponsored by Department of Science and Technology, Government of India Amount Rs. 13.68 lakhs ( Completed)

#### **H. SPONSORED SHORT TERM COURSES**

1. Climate change issues and impacts on water resources management in coastal and seasonal wetlands, June 9-19, 2013 for the officers of BWDB, Bangladesh
2. Climate change issues and impacts on water resources management in coastal and seasonal wetlands, March 11-20, 2013 for the officers of BWDB, Bangladesh
3. Remote sensing and GIS applications in hydro-power projects, Jan. 21-23, 2013 for the officers of NHPC Ltd.
4. Remote sensing and GIS applications in hydro-power projects, Jan. 14-18, 2013 for the officers of NHPC Ltd.
5. Hydrological analysis for water resource planning and management in environmental aspects, June 11-22, 2012 for the officers BWDB, Bangladesh
6. Climate change effect on flood estimates and hydrological variables, March 5-14, 2012 for the officers BWDB, Bangladesh
7. Crop Water Management, Dec. 13-17, 2011 for the officers of minor Irrigation, Govt. of Orissa.
8. Estimation of design flood and design of spillways for minor irrigation projects Dec. 1-5, 2011 for the officers of minor Irrigation, Govt. of Orissa.
9. Remotes sensing and GIS applications for hydro-power projects, October 19-21, 2011 for the officers of NHPC Ltd.
10. Hydrological and water resources planning for minor irrigation projects, Sept 26-30, 2011 for the officers of minor Irrigation, Govt. of Orissa.
11. Remotes sensing and GIS applications for hydro-power projects June 20-22, 2011 for the officers of NHPC Ltd.
12. Flood estimation in a changing climate March 5-12, 2011 for the officers of Institute of Water Modeling, Govt. of Bangladesh

13. Urban flood modeling and drainage design, March 22-27, 2010, sponsored by Govt. of Sri Lanka
14. Remote sensing and GIS applications for Hydro-power projects, Feb. 22-27, 2010 sponsored by NHPC Ltd.
15. Ground water resource evaluation in Hard rock areas, Oct. 19- 24, 2009, sponsored by ground water Department, Govt. of Andhra Pradesh
16. Mathematical modeling of Ground water systems, Jan. 4-16, 2010 and March 16-28, 2009, sponsored by C.G.W.B.
17. Mathematical modeling of Ground water systems, March 16-28, 2009, sponsored by C.G.W.B.
18. Hydrological Analyses and Planning for Water Resources Projects with Exposure to Emerging Tools, Nov. 16 – 21, 2008, sponsored by Maharashtra Water Resources Department
19. Urban Flood Modeling and Drainage Design, Sept. 22 – 27, 2008, sponsored by MMRDA
20. Planning Analyses and Modeling of Groundwater in Hard Rock Areas, Sept. 01- 06, 2008 Sponsored by GSDA, Pune, Govt. of Maharashtra
21. Planning Analyses and Modeling of Groundwater in Hard Rock Areas, Aug. 18- 23, 2008, sponsored by Department of Mines and Geology, Govt. of Karnataka
22. Groundwater Planning, Analyses and Modeling in Hard Rock Areas, sponsored by Department of Mines and Geology, Govt. of Karnataka, July 21 – 26, 2008
23. Hydrological Analyses and Planning for Hydro Power Project, June 9-14, 2008, sponsored by NHPC Ltd.
24. Hydrological Analyses and Planning for Hydro Power Project, Dec. 17-22, 2007, sponsored by NHPC Ltd.
25. Hydrological Analyses and Planning for Hydro Power Project with emphasis on Design flood Estimation, Oct. 1-6, 2007, sponsored by Damodar Valley Corporation
26. Design flood analysis for hydropower projects, Aug. 20-25, 2007 sponsored by NTPC Ltd.
27. Hydrological Analyses and Planning for Hydro Power Project with emphasis on Design flood Estimation, Jul 2-7, 2007, sponsored by NHPC Ltd.
28. Hydrological Analyses and Planning for Hydro Power Project with emphasis on Design flood Estimation. Feb. 19-24, 2007, sponsored by Satluj Jal Vidyut Nigam Ltd.
29. Hydrological analyses and planning for Hydropower projects with emphasis on design flood estimation, Dec. 18-23, 2006 sponsored by Damodar Valley Corporation.
30. Urban flood disaster modeling and management Oct. 16-21, 2006 in joint collaboration with UNESCO-IHE, Netherlands, funded by NUFFIC.
31. Hydrological analyses and planning for Hydropower projects with emphasis on design flood estimation, July 31-Aug. 5, 2006, sponsored by NHPC Ltd.
32. Hydrological analyses and planning for Hydropower projects, June 5-10, 2006, sponsored by NTPC Ltd.

**I. Details of Visits Abroad:**

- - August 1983 - Jan. 1984, Colorado State University, Fort Collins, U.S.A., Also visited USGS, University of Texas, Purdue university, Harvard, MIT etc. across USA
- - Nov. 1987 - Dec. 1987, University College Galway, Ireland.
- - Dec., 1998 - March, 1999, University of Waterloo, Waterloo, Canada
- Tufts University, Medford, MA, USA

*Curriculum Vitae Dr. N.K. Goel*

- - May 2001 to August 2001 University of Waterloo, Canada
- - June 2003 to July 2003 University of Waterloo, Canada
- -Oct. 2005 Norway, UNESCO-IHE Delft
- -Sept. 2006 Nanjing, China, AIT, Bangkok
- -March-April 2007 UNESCO- IHE Delft, WMO, Geneva, Switzerland
- -June 2007 UNESCO-IHE, Delft
- Sept. 23-25, 2011 Dhaka, Bangladesh, Institute of Water Modelling
- July 13-22, 2012 TUHH, Germany, WMO Geneva, Dubai

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