

UNDERTAKING

I, *Sanjay Kumar Srivastava*, certify that the work embodied in this Ph.D. thesis titled “*Optimization of Pipe Network Design Using Genetic Algorithms for Newtonian and Non-Newtonian Fluid*” is my own bonafide work carried out by me under the supervision of *Prof. Prabhat Kumar Singh Dikshit*, Professor, Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi, and co-supervision of *Dr. Rajesh Kumar*, Associate Professor, Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University), Varanasi. The whole responsibility of my research work is mine and I am always ready for making improvement at any time if it requires.

Date

Place: IIT (BHU), Varanasi

(Sanjay Kumar Srivastava)

**CERTIFICATE FROM THE SUPERVISOR AND
CO-SUPERVISOR**

This is to certify that the above statement made by the candidate is correct to the best of our knowledge.

Signature of the Co-Supervisor

(Dr. Rajesh Kumar)

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Signature of the Supervisor

(Prof. Prabhat K. S. Dikshit)

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Signature of the HOD with seal

(Prof. P. K. Singh)

Professor and Head
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ANNEXURE-F

COURSE WORK / COMPREHENSIVE EXAMINATION/ PRE-SUBMISSION SEMINAR COMPLETION CERTIFICATE

This is to certify that *Mr Sanjay Kumar Srivastava*, a bonafide research scholar of Department of Civil Engineering, Indian Institute of Technology (Banaras Hindu University), has satisfactorily completed the course work/ comprehensive examination/ pre-submission seminar requirement which are a part of his Ph. D. program.

Date

Place: IIT (BHU), Varanasi

Signature of the Head of the Department



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PRE-Ph.D. SEMINAR COMPLETION CERTIFICATE

This is to certify that *Mr Sanjay Kumar Srivastava*, Enrolment No. 339240 (Roll No. 11603EN005), a bonafide research scholar of the Department of Civil Engineering, IIT (BHU) presented his pre-submission seminar on the topic “*Optimization of Pipe Network Design Using Genetic Algorithms for Newtonian and Non-Newtonian Fluid*” before the RPC members and DPGC members of the Department of Civil Engineering, on 27th March, 2015 at 4.00 p.m. in the Seminar Room of Civil Engineering Department. He has successfully completed the presentation, which is a part of his Ph. D. program. His presentation was satisfactory and his case is recommended for the submission of his Ph. D. thesis.

Date

Place: IIT (BHU), Varanasi

(Signature of the Head of the Department)

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Title of the Thesis: **Optimization of Pipe Network Design Using Genetic Algorithms for Newtonian and Non-Newtonian Fluid.**

Candidate's Name: **Sanjay Kumar Srivastava**

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