AKNOWLEDGEMENT

First and foremost, I would like to express my sincere gratitude to my advisor Prof. Prabhat Kumar Singh for his, patience, motivation, immense knowledge, encouragement, cooperation and continuous support during my research work. His guidance helped me to accomplish my task. I could not have imagined having a better guide and mentor for my Ph.D study. Besides my guide, I would like to thank the members of my thesis committee Prof. S. B. Dwivedi, Prof. Y. C. Sharma and Dr. Anurag Ohri for their insightful comments and encouragement.

I would like to thank Er. Ramesh Singh, Retd. Chief Engineer, UP Jal Nigam for his encouragement and valuable technical suggestions. My sincere thanks goes to the staff of Environmental Engineering laboratory Shri Shankar Ram, Shri Jay Singh Yadav and Shri Hira Lal Singh for assisting and helping me in laboratory. I would like to thank my fellow labmates Dr. Satya Prakash Maurya, Mr Manish Ranjan, Mr Chaitanya Nidhi, Mrs Shruti and my scholar friends of Civil Engineering Department IIT (BHU) for stimulating discussion and all the fun we had during this period. Their timely help and friendship shall always be remembered.

My heart felt regards goes to my mother Late Smt. Kamlesh Saxena and father Late Sh. Virendra Kishore Saxena for encouraging me to pursue this study. Their love and support has always been my strength. Their patience and sacrifice will remain my inspiration throughout my life. I am also thankful to my sisters Monika Saxena and Parul Saxena for their constant encouragement, love and moral support.

I owe my deepest gratitude towards Sh. Ravi Prakash Srivastava my better half for his support and understanding of my goals and aspiration. I take immense pleasure in acknowledging the support of my son Devagya who is pride and joy of my life. I love you more than anything and I appreciate all your patience and support during mamma's Ph.D studies.

I am also grateful to my in-laws Sh. Gyan Prakash Srivastava and Smt. Poonam Srivastava for their much needed support and understanding in every possible way. I am thankful to all my family members for their constant support during this period.

Last but not the least, I would like to thank Goddess 'Mahakali' for giving me the strength, knowledge, ability and opportunity to undertake this research study and to persevere and complete it satisfactorily. Without her blessings, this achievement would not have been possible.