Acknowledgments

Throughout this adventure, I felt as if *I was only chasing the moments that were already predefined meticulously by Someone*. I am thankful to that **Marvellous Creator** for encouraging me in accomplishing this thesis. I am thankful again to Him for giving me knowledge and wisdom to work with efficient people and in a professional environment. He has been with me in accomplishing this thesis. On several occasions, it looked as though, for one reason or another, there was no way ahead to progress. Yet, at the eleventh hour and sometimes even at the twelfth hour, a door opened. Without God's help, guidance, encouragement and support through some very difficult times, my thesis could not have been written at all.

My deep sense of gratitude and profound thanks to my supervisor **Prof. Sandeep Kumar**, for his valuable guidance, patience, encouragement and the freedom given to me in carrying out research. Throughout my PhD tenure, he has always been approachable and was helpful. I consider my association with him as a cherishable memory in my life.

I express my heartfelt gratitude to my Research Progress Committee members: Prof. S. K. Singh, Late Prof. J.P. Dwivedi and Dr D. Khan for their evaluation and support in my work.

Life in the spiritual city of Varanasi became homely and friendly. It is a great pleasure to thank my friends in the lab: Mr. Ambuj Sharma and Mr. Kaushik Ranjan. Their creation of joyful atmosphere has made my progress well. I thank fellow research scholars Mr. Durgesh Kumar (CSE Department.), Mr. Sonu Kumar, Mr. Ajeet Kumar Yadav for their valuable assistance. I also thank all the elders who were available for any kind of advice and counselling: Prof. P. C Upadhyay, Late Prof. J. P. Dwivedi, Prof. Rajesh Kumar and Dr Amit Tyagi.

I acknowledge the Department of Mechanical Engineering for the infrastructure provided by them to carry out my research work. I also thank all my friends for their fellowship, without whose support my life might have been miserable here.

A big THANK YOU to my father, wife and children for their love and care.

Sandip Kumar Singh