ACKNOWLEDGEMENTS

It is a pleasure to thank all people directly or indirectly helpful in making this thesis possible.

I have great pleasure and exultation in acknowledging the gratitude towards my respected supervisors Dr. Vivek Sajal and Dr. Ravindra Kumar, Department of Physics and Materials Science and Engineering, Jaypee Institute of Information Technology, Noida. Their constant and inspiring guidance during my research enabled me to finish my thesis work.

I greatly acknowledge my doctoral programme monitoring and advising committee members Prof. D. K. Rai (HoD), Dr. Navneet K. Sharma and Dr. B. P. Chamola for their critical advice, valuable comments and intriguing questions. I am thankful to all my respected teachers of the department of Physics and Materials Science and Engineering, Prof. Anirban Pathak, Prof. S. P. Purohit, Dr. Papia Chowdhary, Dr. Manoj Kumar and entire faculty members of the department for their valuable suggestions and motivations during my research period. I am also thankful to technical staff of the department Munish Verma, Tarkeshwar Mishra, and Kailash Chandra for their support.

There are numerous experts who enlightened me while I was wandering around in the dark, sometimes by pointing out directions, sometimes by asking questions, making comments, and by giving a suggestive hand. I would like to thank Prof. K. C. Mathur [Former HOD (PMSE) JIIT], Prof. V. K. Tripathi (IIT Delhi) and Dr. A. K. Malik (IIT Delhi) for sharing their expertise with me.

Dr. Nidhi Singla, Krishna Gopal (DU), Pradeep Jha, Sunil Chauhan, Shikha Maheshwari, Deepti Makhurai, Kanika Verma and Deepika deserve special thanks for consistent support and affection throughout my research work. I cannot forget friends and my colleague who went through hard times together, cheered me on, and celebrated each accomplishment: Dr. Kuldeep Mishra, Dr. Harshverdhan Tiwari, Dr. G. B. Singh, Dr. Sujata Basu, Dr. Prakash Chandra Sati, Dr. Chitra Shukla, Dr. Mahima, Dr. Gunjan Srinet, Dr. Maneesha Arora, Dr. Vijeyta Pal, Saurabh Singh Pudhir, Ragini Raghav, Kuldeep Katiyar, Snehlata, Sarika, Maitreyi Upadhyay, Subhash Sharma, and many more at JIIT.

With deep gratitude I acknowledge here the role of my parents, Dr. Narendra Kumar Varshney and Smt. Gayatri Devi. Their love, care and the example of wisdom and integrity
gave me a solid foundation to build my life on. I love them so much, and I would not have made it this far without them. I thank for heartwarming kindness and encouragement from the family of my brother: Prasoon Varshney and Praneet Varshney with Sister-in-law Smt. Ritu Varshney and my nephew Adwait Varshney. I am also thankful for the constant love and support of my sister, Neetima Agrawal and Ankan Gupta. Most importantly, I want to thank my wonderful wife Charu Varshney, who has supported me during a critical time in every possible way.

Author is grateful to the Jaypee Institute of Information Technology, Noida for providing teaching assistantship throughout Ph.D. Finally, I thank the almighty God for his blessings which made this thesis possible.

Noida

(Prateek Varshney)