## ACKNOWLEDGEMENT

The author is pleased to express his sincere thanks and gratitude beyond words to his supervisor Prof. Rajnesh Tyagi and co-supervisor Dr. U.S.Rao for their consistent help, encouragement and valuable discussions during the entire period of his research work. The author would not have been able to complete the thesis without their utmost involvement and invaluable efforts. They motivated the author to pursue research problems and the need for persistent effort to accomplish the goal. The author is truly indebted to them.

Besides supervisors, the author would like to thank his RPEC members, Prof. A. P. Harsha and Prof. Vinay Kumar for their insightful comments and encouragement. The author acknowledges his deep sense of gratitude to the current and former Heads of the Department of Mechanical Engineering for providing all the research facilities to accomplish his research in the Department successfully. The author has an immense sense of gratitude to all the faculty members of the Department of Mechanical Engineering, IIT (BHU), Varanasi for their cooperation and inspiration.

The author is grateful to all his friends Mr. Manish Kumar, Mr. Hemant Nautiyal, Mr. Sudesh singh, Mr. Sushil Yadav, Mr. Rabindra Prasad, Mr. Ashish Pareta, Mr. Akash Awale, Mr. Ashwani Ranjan, Mr. Sanjay Gupta, Ms. Pooja Verma, Mr. Nitish Mahto, Km Shafali, Mr. Mithlesh Kumar Mahto, Mr. Adarsh Kumar and seniors especially Dr. Pushkar Jha, Dr. Avinash Ravi Raja, Dr. Manvenda Singh, Dr. Prashant Kumar, for their constant encouragement, making joyful and memorable life being with him in moments of happiness and difficulties at IIT (BHU), Varanasi. The author is also thankful to all the lab and office staff of the department, especially Mr. Vijay Pratap

Srivastava (CAM lab).

The author would also like to express his immense gratitude to his parents Smt. Usha singh and Shri H.B. Singh, and brother Rahul Singh, for their unconditional support and encouragement to pursue his interest. The author also wishes to thank all those who have helped in any manner during the course of his research work.

At last thanks to the almighty God who has given the author spiritual support and courage to carry out this work.

(ROHIT KUMAR SINGH GAUTAM)