## **ACKNOWLEDGEMENTS**

Undertaking this PhD has been a truly life-changing experience for me and it would not have been possible to do without the support and guidance that I received from many people right through the selection of the problem to the implementation.

I am deeply thankful to the honorable chancellor Dr. S.J Chopra, CEO Prof. Utpal Ghosh, the Vice chancellor, Dr. Shri Hari, The Dean Dr. Kamal Bansal, Dr. Suresh, the Director, College of Engineering, for their continuous moral support during the endeavor.

To work with my guides Dr. Piyush Kuchhal, Professor, CoES, UPES and Dr. Rajeev Gupta, has been a real pleasure to me, with lot of enthusiasm and eagerness to know new things. They have been a constant influence throughout my Ph.D. career that have supported me with promptness and devotion, and have always been enduring and encouraging in times of new ideas and difficulties.

In addition, I have been very privileged to get to know and to collaborate with many other great people over the last several years. I learned a lot from them about life, research, how to tackle new problems and how to develop techniques to solve them. Throughout my Ph.D. career, my guides supported me always. Thank you for all the inspiring discussions had every time when I met you at the University of Petroleum & Energy Studies, Dehradun India.

These past several years have not been an easy ride, both academically and personally when I met with accident and undergone surgeries twice. I truly thank my wife for sticking by my side, even when I was irritable and depressed. I feel that what we both learned a lot about life and strengthened our commitment and determination to each other and to live life to the fullest.

SALAUDDIN MOHAMMAD