

# ACKNOWLEDGEMENT

I offer my humble obeisance at the lotus feet of HER **HOLINESS MATA AMRITANANDAMAYI DEVI**, our beloved **AMMA**, for her kind support and inspiration throughout the research work.

It is with great pleasure that I would like to express my sincere gratitude to **Dr. Ganesh Udupa**, Professor of Mechanical Engineering Department, and **Dr. Ganesh Sundaram**, Asst Professor(SG), Department of Physics, Amrita Vishwa Vidyapeetham, Kollam, for their valuable guidance and support. Their valuable advice and encouragement throughout the course of the project is beyond mention.

I sincerely thank **Dr. Balakrishnan Shankar**, Chairman (MED) and Associate Dean, for his valuable support and advice.

I am also indebted to **Dr. Kaimal M R**, Head, PGP, for his constant support, advice and encouragement throughout the work.

I thank **Dr. Nandakumaran V M**, Principal, Amrita School of Arts and Sciences, for agreeing to be a member of the Doctoral Committee and giving valuable suggestions, advice and encouragement.

I also thank **Dr. Jyothi S N**, Principal, Amrita School of Engineering, for her constant support, great help, guidance and encouragement.

I am also thankful to **Dr. G J Nair**, Professor, ECE Dept. for valuable advice and support.

I also express my gratitude to the **faculty** of Mechanical Engineering Department for their support and cooperation.

I am indebted to the **ICTS** department for providing me with a powerful PC and installing various software to work towards the project.

I also thank **Electrical Maintenance Dept.** for providing electric power 24 x 7 that was helpful in accomplishing my work without any breakdown.

I also am very much thankful to my wife **Preetha P K** and daughter **Arya Pramod**, without whose support, patience and understanding, I could not have completed this work successfully.

I am highly indebted to my **parents** who have helped me develop the ability to undertake this work.

I am grateful to **Mr. Surendran K N** who assisted in conducting experiments.

I am grateful to **Mr. Lanilal** who assisted in computer-assisted drawing many of the figures given in this report.

I am also thankful to **Mr. Kannan G** who was of help in assisting with the experiments.

I also extend my thanks to **many others** who are not personally named here but who nevertheless had contributed in such a magnanimous way that without whose help this thesis would not have seen the light of the day.

**Pramod Sreedharan**  
(AM.EN.D\*MEC09042)