

## *Preface*

Thermodynamics often confuses a beginner. And, there are valid reasons for it. Let us, for instant, consider how the fundamental laws of thermodynamics are introduced to an absolute beginner. Many texts introduce the first law by the statement ‘When any closed system is taken through a cycle, the net work delivered to the surroundings is proportional to the net heat taken from the surroundings.’ And, the second law is introduced by the Kelvin-Planck and the Clausius statements, that are about the limits placed in physically realizing engines whose working fluids operating in cyclic processes.

Such an introduction to thermodynamics and teaching of the resulting corollaries, I realized, only made the young people grew indifferent to thermodynamics. Majority of them wrote in their course-teacher evaluation sheets that they found it hard to relate to thermodynamics. They, the students, made one thing very clear to me that, if they were to like the subject thermodynamics, the subject matter should be presented in a simple-and-easy-to-understand style.

I took up the challenge. I let go the historical approach to teaching thermodynamics. I introduced the first law as an expression of the Conservation of Energy Principle. It is very neat to start with the conservation of energy principle because the students find it easy to relate to conservation principles. With that simple tool, it is straight forward to obtain the mathematical expressions for the first law of thermodynamics applied to closed and open systems. Such approach, as I realized, was very appealing to the young minds.

I also introduced each and every feature related to the first law of thermodynamics, even those that might seem obvious to many, in great detail. I taught them what heat is and what it is not. Entropy, I introduced, as yet another property without making the students attach any unnecessary importance to that. The second law is introduced, following the style of the great thermodynamic teacher, Professor H.C. Van Ness, by the most general, yet the simplest, statement based on the property entropy, which the students have already got familiar with.

Slowly, to my surprise, thermodynamics became the favourite subject among the majority of the engineering students. ‘Thermo’ found its way to the hearts of even those who were head to foot in love with

the ‘electronic chips.’ The beginners, well at least a majority of them, fell in love with thermodynamics. And, I started to enjoy teaching thermodynamics.

This book on thermodynamics, written in an unconventional and a ‘student-friendly’ style, is the outcome of that fantastic experience of people from two very different generations coming to a meeting point in enjoying Thermodynamics together.

My sincere thanks are due to Mr. V. Shanmugaratnam of the Department of Mechanical Engineering, University of Peradeniya, for reading through the draft manuscripts at its different stages, and for his encouraging feedbacks on the subject matter as well as on the style in which it is presented.

I am indebted to Prof. S. Sivasegaram, former Head, Department of Mechanical Engineering, University of Peradeniya, for providing me the luxury of constructive criticism on the draft manuscript.

I gratefully acknowledge Prof. C.L.V. Jayathilake, former Dean, Faculty of Engineering, and former Vice-Chancellor, University of Peradeniya, for his positive comments on the draft manuscript.

The final revision of this book was carried out to accommodate the suggestions and the comments made by Prof. Nihal E. Wijesundera of the National University of Singapore, and the other reviewer, the identity of whom is unknown to me, assigned by the publisher of this book.

I am extremely grateful to both of you for the positive influence your suggestions and comments had in finalizing the book to my satisfaction, for the content of which I take full responsibility.

The chapter on Power Plants owes its existence to the *Training Programme on Thermodynamics for AES Kelanitissa Plant Engineers*, that I conducted for the plant engineers at the Combined Gas Turbine - Steam Turbine Power Plant, AES Kelanitissa (Pvt) Ltd., Sri Lanka. I thank Mr. Ravi Chandran, Plant Manager, for the opportunity provided.

I am also pleased to acknowledge my indebtedness to Dr. A.A. Shelton Perera, Director, Science Education Unit, Faculty of Science,

University of Peradeniya, and to the other honourable members of the Unit for getting the manuscript critically reviewed and for publishing this book.

My warm thanks are to you, Mr. Suranga Manohara, Civil Engineering & Graphic Design Consultant, for making my book a beauty with your cover design, and for your valuable time.

And, my thanks are also due to my colleagues at the department, for their generosity in letting me have that TIME that I badly needed to finish this book, and for their steady support.

Finally, dear Kirthi, you have your ways in making me contribute in the uncompromising ways that I always do and always want to do. Thanks dear. I also thank all the other dear ones of my life, Katherina and Maggie in particular, for wanting, so very badly, to see this book going to print.

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