

# Chapter 1: Introduction to Thermofluid

## Objectives:

- (1) Understand the scope of studies in the field of Thermofluid
- (2) Explain and apply the following Basic Concepts of Thermofluid:
  - System
  - Surroundings
  - Boundary
  - Properties of a System
  - State of Equilibrium
  - Work Transfer
  - Heat Transfer
- (3) Appreciate the correlation between Thermodynamics and Fluid Mechanics

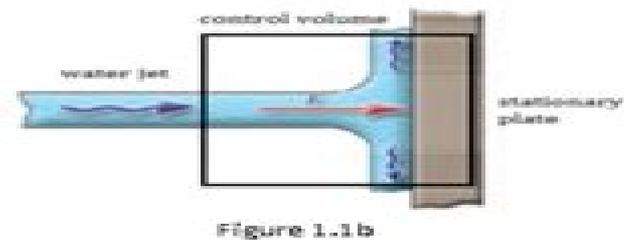
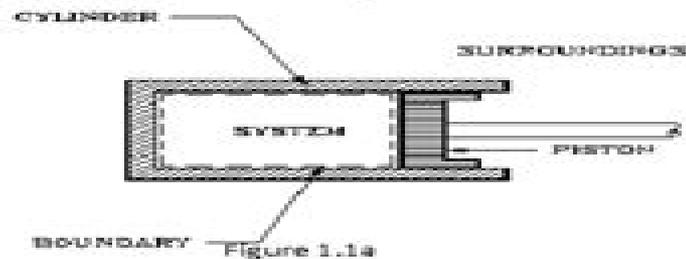
## 1.1 Introduction

Thermofluids is a branch of science and engineering that consist of 4 intertwined field of studies: Thermodynamics, Fluid Mechanics, Heat Transfer and Combustion. The word 'Thermo' refers to heat and 'Fluid' refers to liquid, gas or vapor. In this module, we shall focus on the Thermodynamics and Fluid Mechanics aspect of things, in particular, the energy considerations for thermal and fluid (mass) transfer.

## 1.2 Basic Concept of Thermofluids

### 1.2.1 Definitions of a system

A **system** is defined as a collection of matter (fluid) within a prescribed region of interest. For example, Figure 1.1a, the fluid contained between the cylinder walls and the piston may be said to be the system. Another similar idea known as the **control volume** can be applied as shown in Figure 1.1b.



**Surrounding** is the region enclosing the system as shown in Figure 1.1a. The surroundings may interact with the system via energy or mass transfer.

**Boundary** is the surface that separates the system from the surroundings. Do note that the boundary can be either a physical (Figure 1.1a) one or an imaginary one (Figure 1.1b). In the context of Figure 1.1b, this boundary is referred to as a **control surface**.

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**Katrin Zwirgmaier**



## **Thermofluids Data University Of Cambridge:**

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