Thermodynamics I

Lecture 1 & 2

Course Introduction

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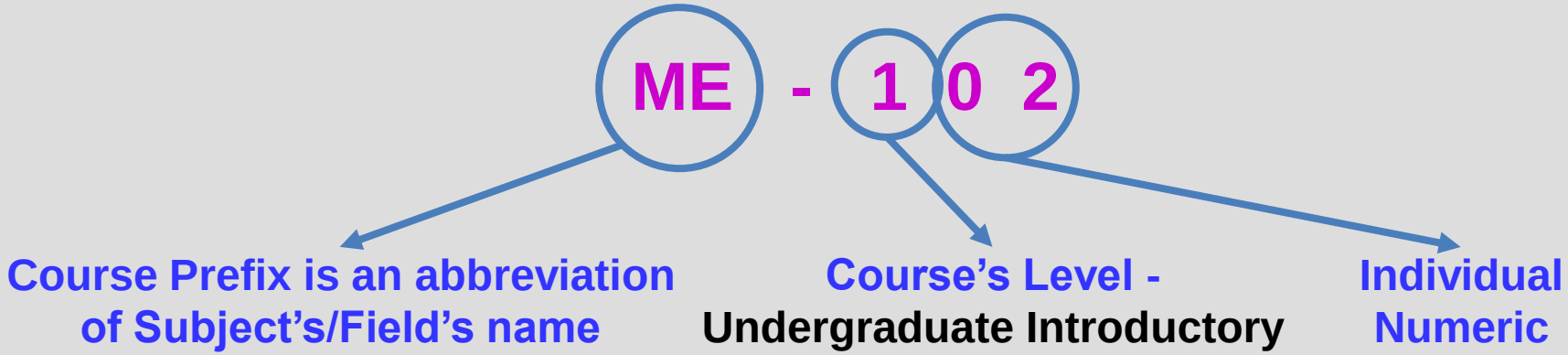
Today's Lecture

- About the Course Title
- Motivation for learning the Course
- Course Objective and Description
- Text and Reference Books
- My introduction

About the Course Title



Thermodynamics

The branch of physics that deals with heat, work, and temperature, and their relation to energy, radiation, and physical properties of matter.

The behavior of these quantities and laws that govern them

Thermodynamics applies to a wide variety of topics in science and engineering

Motivation for Learning the Course

Predictions of Life

At home:

- Homes are constructed better to reduce heating and cooling needs.
- Homes have systems for electronically monitoring and regulating energy use.
- Appliances and heating and air-conditioning systems are more energy-efficient.

Transportation:

- Plug-in hybrid vehicles and all-electric vehicles dominate.
- Hybrid vehicles mainly use biofuels.
- Use of public transportation within and between cities is common.
- An expanded passenger railway system is widely used

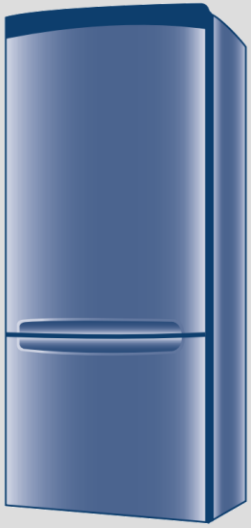
Lifestyle:

- Efficient energy-use practices are utilized throughout society.
- Recycling is widely practiced, including recycling of water.
- Distance learning is common at most educational levels.
- Telecommuting and teleconferencing are the norm.

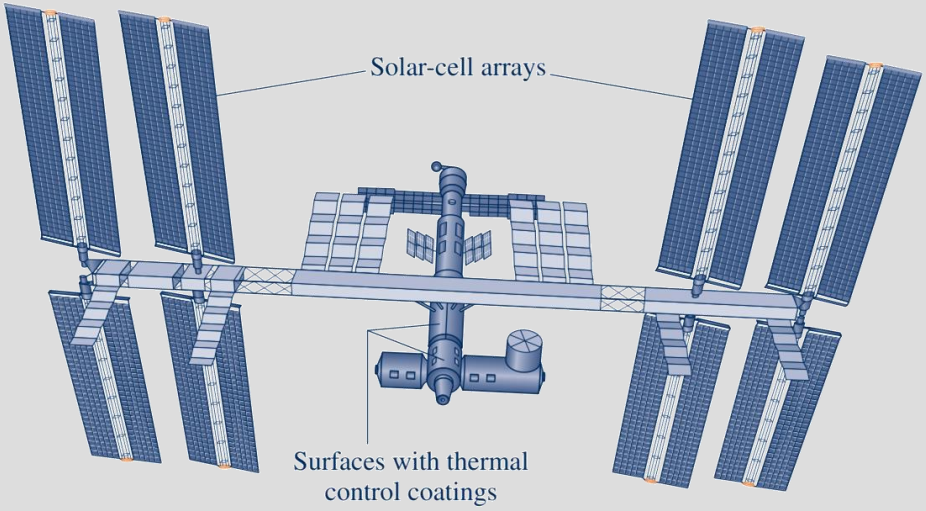
Power Generation:

- Electricity plays a greater role throughout society.
- Wind, solar, and other renewable technologies contribute a significant share of the nation's electricity needs.
- A smart and secure national power transmission grid is in place.

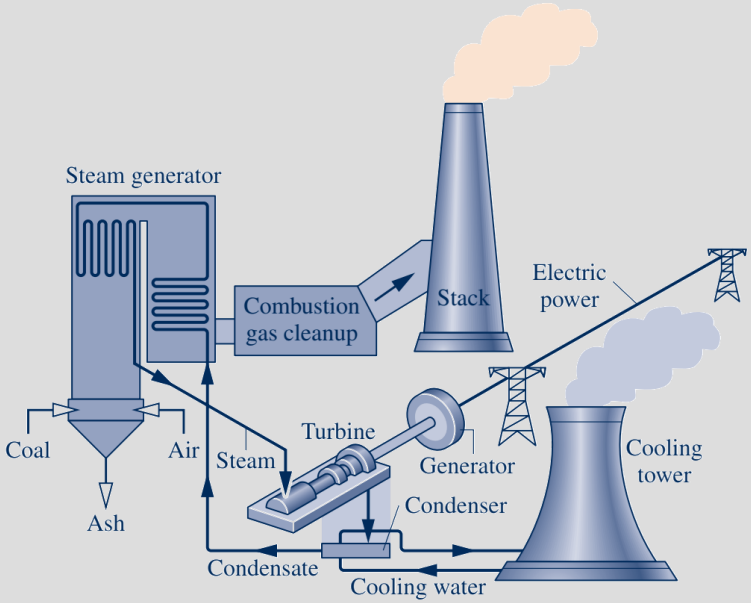
Application Areas of Engineering Thermodynamics



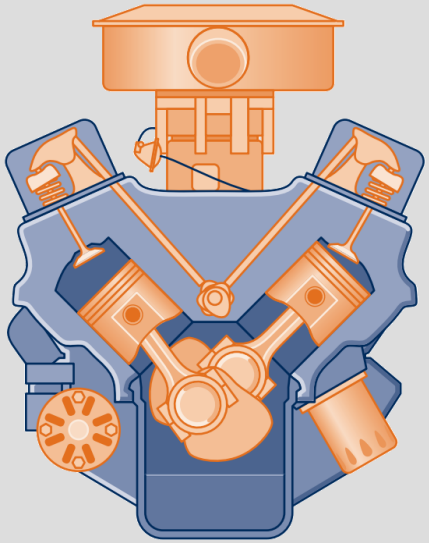
Refrigerator



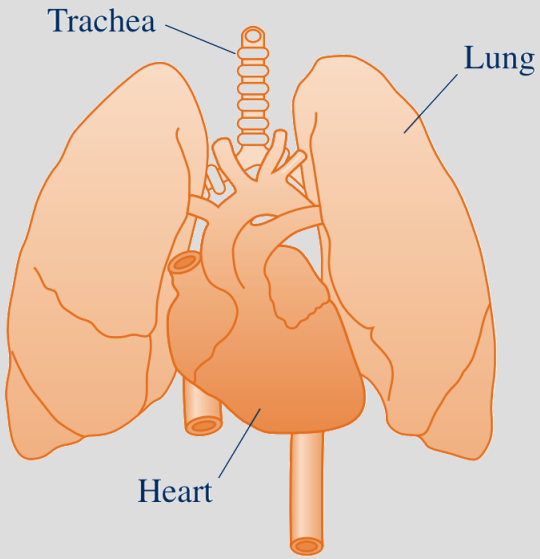
International Space Station



Electrical power plant



Vehicle engine



Biomedical applications

Course Objective

- The course is designed as a bridge between the sciences of thermodynamics and fluid dynamics to understand better the processes of heat and mass transfer and their applications to modern industry.

- It should also help students to appreciate the elegance and power, as well as the limitations of the science he is using.

Course Description

- The aim of the course is to give basic concepts of thermodynamics.
- The students will learn to evaluate basic thermodynamic variables involved in different thermodynamic processes of closed and open systems.
- An energy balance of various thermodynamic cycles will be taught.
- It provides foundation for power plants, gas dynamics and energy divisions of the mechanical engineering.

Text and Reference Books

Text Book:

- Y. A. Cengel, M. A. Boles, “Thermodynamics: An Engineering Approach”, 8th or 9th Edition (SI Units), McGraw-Hill Education, (2016).

Reference Books:

- M. J. Moran, H. N. Shapiro, D. D. Boettner, “Fundamentals of Engineering Thermodynamics”, 7th Edition, J. Wiley & Son. (2011)
- R. E. Sonntag and C. Borgnakke, “Fundamentals of Thermodynamics”, 8th Edition, Wiley, (2012).

Course Learning Outcomes (CLO)

Upon successful completion of this course the students will be able to demonstrate the following:-		BT LEVEL	PLO
CLO_1	Able to illustrate the basic concepts of thermodynamics and its application in various industrial components.	**C2**	**1**
CLO_2	Able to identify, heat and/or work interactions between system and surroundings and formulate thermodynamic properties of open and closed system by using laws of thermodynamics.	**C3**	**2**
CLO_3	Compute and demonstrate thermodynamic processes on appropriate thermodynamic diagrams, such as a temperature-entropy or pressure-volume diagram.	**C3**	**2**
CLO_4	Able to analyze the feasibility of systems and their impact on environment using the laws of thermodynamics under the aspects of power, energy and entropy of closed systems and control volumes.	**C4**	**7**
* BT=Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A=Affective domain			

End of Lecture