

Title: Thermodynamics, “the laws of the Universe” from Steam engines, life processes to galactic rotation. Part I

Please note: 2 semester course.

This class will be a discussion of classical thermodynamics using the Great Course, “Thermodynamics: Four laws that move the Universe” as the core teaching material. The class is intended to be a two part (two semester) program. We will augment the core material with explanations of the simple math used in the class, history of the development of thermodynamic science and some specialty items of interest.

Some specialty items will be “how batteries work”, generation of electricity from river mouths using osmotic pressure and a few others that we develop.

The first semester course presentation is as follows:

1. Introduction to Thermodynamics
2. Variables and the flow of energy
3. Temperature, the first force
4. Salt, soup, energy and Entropy
5. The ideal gas law and pistons
6. Energy transferred and conserved
7. Work-Heat Equivalence
8. Entropy- the arrow of Time
9. The Chemical Potential
10. Enthalpy, Free Energy and Equilibrium
11. Mixing and Osmotic Pressure
12. How Materials hold heat