

## Course Description

Course title: **Thermodynamics**

Hours per week: 12h/week/ 4 weeks

Number of credits allocated/ work load: a) 48 contact hours  
b) 3 US credits recommended  
c) 4 ECTS credits

### Course contents:

- Introduction and definitions
- Units, properties and analysis
- Work, power and energy
- Energy and the first law of Thermodynamics
- Properties of pure substances
- The first law of Thermodynamics (Control Volume)
- The second law of Thermodynamics
- Entropy
- Exergy
- Examples of Power Cycles
- Examples of Refrigeration Cycles
- Combustion

Objective of the course/learning outcome: The overall objective of this course is to develop in the student an ability to logically define and analytically solve problems involving work, heat, and energy. This includes a clear understanding of the definition of a thermodynamic system, the concept of a thermodynamic state, determination of fluid properties for liquids, ideal and real gases and fluids with phase changes. The student will learn how to apply these concepts in the application of the first law of thermodynamics to both closed and open systems, and develop an understanding of the limitations placed on processes and heat engines by the second law of thermodynamics. Furthermore, examples for power and refrigeration cycles will be shown and calculated and an introduction to combustion will be given.

### Prerequisites:

Engineering Mathematics (incl. calculus and differential Dynamics)  
recommended for Junior Year students

### Recommended Reading:

Fundamentals of Engineering Thermodynamics, 7th Edition by M. Moran & H. Shapiro, John Wiley & Sons

Assessment methods: 90 min. Final Exam

Language of instruction: English

Name of Lecturers: Prof. Dr. Rolf Herz (1. Semesterhälfte)  
Prof. Dr. Roland Kraus (2.Semesterhälfte)