

## Course: Thermodynamics I

credits: 4

<b>Course code</b>	WBVP17TD1
<b>Name</b>	Thermodynamics I
<b>Study year</b>	2022-2023
<b>ECTS credits</b>	4
<b>Language</b>	English
<b>Coordinator</b>	W.F.J. Swart Ranshuysen

<b>Modes of delivery</b>	Education
<b>Assessments</b>	Thermodynamics I - Written, organised by STAD examinations

### Learning outcomes

After finishing this module the student:

- explains the first law of thermodynamics for closed and open systems to converting heat into work in internal combustion engines
- knows the various gas laws and equations of state and apply them to solve problems of gas mixtures in estimating enthalpy, specific heat and internal energy
- calculates the effect of changes to the engine on the thermodynamic efficiency and power and relates these calculations to the p-V diagram
- understands the different types of heat transfer processes such as conduction, convection and, radiation
- calculates speed triangles and the effect of speed, load, blade and shape

### Content

This course (4 EC) deals with the equations of state, the first law of thermodynamics, p-V diagrams, ideal gas (Boyle-Gay-Lussac). Thermodynamics deals with physical principles behind energy conversions in machines, and provides the foundation for calculations on power and efficiency. We will study the machines where a continuous gas flow running through it, which can be viewed only as an open system. Particularly in components such as pumps, turbines and nozzles, and to systems such as gas turbines (applied in aircraft, helicopters, power plants). In addition, the concept of speed triangles of axial and radial pumps, heat transfer types such as conduction, convection and, radiation are also covered in this course.

### Included in programme(s)

Mechanical Engineering VWO a 3-year variant

### School(s)

Institute of Engineering

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