

Module: Principles of Thermodynamics I

Level	Bachelor	Short Name	PTDyn I
Responsible Lecturers	Pietsch, Arne, Prof. Dr.-Ing.		
Department, Facility	Mechanical Engineering and Business Administration		
Course of Studies	Mechanical Engineering, Bachelor		
Compulsory/elective	Compulsory	ECTS Credit Points	4
Semester of Studies	5	Semester Hours per Week	4
Length (semesters)	1	Workload (hours)	120
Frequency	WiSe	Presence Hours	60
Teaching Language	English	Self-Study Hours	60

The following section is filled only if there is **exactly one** module-concluding exam.

Exam Type	Written Exam	Exam Language	English
Exam Length (minutes)	120	Exam Grading System	One-third Grades
Learning Outcomes	Upon successful completion of this course, the student will: <ul style="list-style-type: none"> • be able to calculate thermodynamic properties • apply the ideal gas and incompressible liquid models to thermodynamic problems. • write an energy balance for closed and open systems, and use it to evaluate process components, including determination of work and heat transports. • analyse and evaluate the performance of refrigeration and power cycles • understand entropy and use it to evaluate processes 		
Participation Prerequisites	Prerequisites: differential and integral calculus; partial derivatives		

The previous section is filled only if there is **exactly one** module-concluding exam.

Consideration of Gender and Diversity Issues	<ul style="list-style-type: none"> ✓ Use of gender-neutral language (THL standard) ✓ Target group specific adjustment of didactic methods ✓ Making subject diversity visible (female researchers, cultures etc.)
Applicability	The subsequent module is Principles of Thermodynamics II
Remarks	The first subject in engineering thermodynamics for the mechanical engineering student serves as a building block for thermodynamic oriented subjects to follow. Specific topics include definitions, first law, second law, heat and work transport, and the steady flow energy equation.

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(of Module: Principles of Thermodynamics I)

Course Type	Lecture	Form of Learning	Presence
Mandatory Attendance	no	ECTS Credit Points	4
Participation Limit		Semester Hours per Week	4
Group Size		Workload (hours)	120
Teaching Language	English	Presence Hours	60
Study Achievements ("Studienleistung", SL)		Self-Study Hours	60
SL Length (minutes)		SL Grading System	One-third Grades

The following section is filled only if there is a course-specific exam.

Exam Type		Exam Language	
Exam Length (minutes)		Exam Grading System	
Learning Outcomes			
Participation Prerequisites			

The previous section is filled only if there is a course-specific exam.

Contents	Definitions, first law, second law, heat and work transport, steady flow energy equation; ideal gases, cycle processes, enthalpy, entropy
Literature	THERMODYNAMICS: AN ENGINEERING APPROACH, Yunus Çengel, Michael A Boles
Remarks	