

Curricular Unit Form (FUC)

Course:	FIRST CYCLE IN MECHANICAL ENGINEERING					
Curricular Unit (UC)	Thermodynamics				Mandatory	x
					Optional	
Scientific Area:	Basic sciences					
Year: 2	Semester: 1	ECTS: 5,5		Total Hours: 67,5		
Contact Hours:	T: 45	TP:16,5	PL: 6,0	S:	OT:	TT:
Professor in charge		Academic Degree /Title		Position		
Catarina M.M.A. Rosa Leal		PhD		Prof. Coordenador		

T- Theoretical ; TP – Theory and practice ; PL – Laboratory ; S – Seminar ; OT –Tutorial ; TT – Total of contact hours

Entry into Force	Semester: Winter	Academic Year: 2013/2014
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Objectives of the curricular unit and competences (max. 1000 characters)

- The main goal of this course is to introduce the fundamental concepts of Thermodynamics: the first and second laws. Each chapter will be accompanied by engineering applications.
- It is intended that the concepts of thermodynamics are acquired in a practical and intuitive manner, recurring to experiments.
- It is intended that the student acquires the necessary skills to write a report with a correct and scientific treatment of experimental data.

Syllabus (max. 1000 characters)

Fundamental concepts: Closed and open systems. Properties of a system: P, T and V. State and equilibrium. Processes and cycles. The zero-th law of thermodynamics.
 Properties of pure compressible substances - water, ideal gas and real gases.
 The first law of thermodynamics - closed systems.
 The first law of thermodynamics - open systems.
 The second law of thermodynamics – Carnot heat engines.
 Entropy. The third law of thermodynamics.

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Demonstration of the syllabus coherence with curricular unit's objectives (max. 1000 characters)

The chapters of the syllabus correspond to the fundamental concepts referred in the objectives of the curricular unit.

Teaching methodologies (including evaluation) (max. 1000 characters)

Teaching Method: Lectures and practical sessions. The practical sessions include the resolution of problems (10 sessions aprox.) and laboratory experiments (4 sessions). The laboratory sessions are mandatory.

Assessment: Two exams during the semester, or a final exam (Theory), and a practical component in the laboratory, with 3 practical works (Lab). Final grade: 70% Theory + 30% Lab.

Demonstration of the teaching methodologies coherence with the curricular unit's objectives (max. 3000 characters)

The exams measure the acquisition of the fundamental concepts. The experiments allow the practical acquisition of these fundamental concepts, as referred in the objectives of the curricular unit.

Main Bibliography (max. 1000 characters)

- Y.A. Cengel e M.A. Boles, "Termodinâmica", McGraw-Hill de Portugal, 2001.
- M.S. Marreiros, "Termodinâmica I", AEISEL, 1999.
- M. Moran and H. Shapiro, "Fundamentals of Engineering Thermodynamics", SI version, John Wiley & Sons, 1993.
- W. Reynolds and H. Perkins, "Engineering Thermodynamics", McGraw-Hill, 1993.