Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**25978 – Thermal Engineering**
Qualification	**Degree in Industrial Chemical Engineering**
Type	**Compulsory**
Credits	**6 ECTS**
Year	**2**
Term(s)	**1st**
Department	**Thermal Machines and Heat Engines**
Language	**Spanish and Basque**

Outcomes / Objectives

APPLIED THERMODYNAMICS. HEAT TRANSFER.

Syllabus

1-KEY DEFINITIONS. Brief review of the general knowledge of the content area

2-ENERGY IN THERMAL ENGINEERING. HEAT AND WORK: Energy concepts used in Thermal Engineering

3-PURE SUBSTANCES AND IDEAL GASES. Description of the two most common states of matter in Thermal Engineering: Gas (ideal or real) and vapour-liquid, near saturation

4-FIRST PRINCIPLE OF THERMODYNAMICS. Closed and Open systems. Analysis of the first law applied to the two classical systems in Thermal Engineering

5-SECOND PRINCIPLE OF THERMODYNAMICS. Theoretical study of the second law, its premises, and its practical application: The property ENTROPY

6-BASIC GAS POWER CYCLES. Internal Combustion Engines. Petrol and diesel engines

7-BASIC VAPOUR POWER CYCLES. Study of the application of thermodynamics to simple vapour power plant cycles.

8-REFRIGERATION CYCLES. Refrigeration cycles and heat pumps.

9-PSYCHROMETRICS. Moist air and air conditioning. General study of air and water vapour mixtures

10-HEAT TRANSFER. General principles and conduction. Heat transfer systems, with a focus on heat transfer by conduction.

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
48			12					
Student Hours of Non Face-To-Face Activities								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
72			18					

Assessment System

General criteria

Written essay exam

Written multiple-choice test

Practical activities (exercises, case studies or problems)

Individual assignments

Presentation of assignments, reading...

Clarification regarding assessment

CONTINUOUS ASSESSMENT WILL INCLUDE THE COMPLETION OF EXERCISES TO BE SUBMITTED WEEKLY OR AS OTHERWISE SPECIFIED, WITH A MINIMUM OF FIVE

STUDENTS WILL BE RANDOMLY SELECTED TO PRESENT THEIR WORK FOR ASSESSMENT

SOME WORK MAY BE ASSESSED AS A GROUP

CLASS ATTENDANCE AND PARTICIPATION WILL BE TAKEN INTO CONSIDERATION IN THE ASSESSMENT

THERE WILL BE THREE SHORT WRITTEN EXAMS (APPROXIMATELY 1 HOUR) THROUGHOUT THE COURSE

THIS WILL ACCOUNT FOR 70% OF THE FINAL GRADE, AND WHERE DEEMED APPROPRIATE, STUDENTS MAY BE EXEMPTED FROM SITTING THE FINAL EXAM

ASSESSMENT OF WRITTEN ESSAY EXAM AND/OR MULTIPLE-CHOICE TEST: AT THE END OF THE COURSE, STUDENTS WILL TAKE A SINGLE WRITTEN TEST WHICH ACCOUNTS FOR 20% OF THE FINAL GRADE

STUDENTS WILL BE REQUIRED TO COMPLETE AN INDIVIDUAL LABORATORY ASSIGNMENT AND SUBMIT A REPORT, WHICH WILL ACCOUNT FOR 10% OF THE FINAL GRADE

FOR STUDENTS WHO HAVE NOT COMPLETED ALL THE CONTINUOUS ASSESSMENT TESTS, THE FINAL EXAM WILL ACCOUNT FOR 100% OF THE FINAL GRADE AND WILL INCLUDE KNOWLEDGE OF LABORATORY PRACTICE

Bibliography

Basic Bibliography

TERMODINAMICA - Cengel

FUNDAMENTOS DE INGENIERÍA TERMODINÁMICA- Moran - Shapiro

INGENIARITZA - TERMIDINAMIKARES OINARRIAK - Moran - Shapiro

TRANSFERENCIA DE CALOR Y MASA - Cengel, 3rd ed.

TERMODINAMICA PARA INGENIEROS - Schaums (problems)

In-depth Bibliography

REFERENCE LISTS WILL BE SUPPLIED WITH THE DOCUMENTATION FOR EACH UNIT

Websites

- WEBSITE ADDRESSES WILL BE SUPPLIED WITH THE DOCUMENTATION FOR EACH UNIT