

Course guide

240EM144 - 240EM144 - Materials Joining Technologies

Last modified: 26/06/2025

Unit in charge: Barcelona East School of Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree: ERASMUS MUNDUS MASTER'S DEGREE IN ADVANCED MATERIALS SCIENCE AND ENGINEERING (Syllabus 2014). (Optional subject).

Academic year: 2025 **ECTS Credits:** 4.5 **Languages:** Spanish

LECTURER

Coordinating lecturer: Mateo Garcia, Antonio Manuel

Others: Santana Perez, Orlando Onofre
Girones Molera, Anna

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMCEM-02. (ENG) Dissenyar i desenvolupar productes, processos, sistemes i serveis, així com l'optimització d'altres ja desenvolupats, atenent a la selecció de materials per a aplicacions específiques

TEACHING METHODOLOGY

In the classes of theory, the basic concepts of the subject will be exposed, starting from textbooks as a general reference. The subject will be complemented with other materials, like outlines or summaries of the theoretical concepts and fundamental laws, tests to appraise the assimilation of the theoretical concepts, collections of problems, hyphens of practices, etc...

In the classes, the proposed test questions, which the students will have worked previously at home, attempting to favour a discussion of the concepts on the part of the students will be solved. Besides the blackboard different didactic resources will be used like transparencies and presentations with computer. Real pieces of material, representative varying ones of the different processes of union with faults and failures will be presented to the classes.

The practices of laboratory will be carried out by small groups and will consist of the realization of the practice in the laboratory and the writing of a report with the results and the discussion. They will allow that the student familiarizes himself with determinate instruments, that develop his critical observation and that approaches to the scientific method and becomes familiar to analyzing and presenting experimental results. The sessions of practices have duration of two hours. Together with the examination of theory, there will be an examination with questions about the sessions of laboratory practices.

LEARNING OBJECTIVES OF THE SUBJECT

objectives

STUDY LOAD

Type	Hours	Percentage
Self study	72,0	64.00
Hours large group	40,5	36.00

Total learning time: 112.5 h



CONTENTS

title english

Description:

1. FUNDAMENTS OF WELDING Definitions. Importance of welding.
Types of welding. Physics of welding.

2. WELDING PROCESSES

Arc welding
Resistance welding
Gas welding
Solid state welding.
Filler metals. Fluxes.
Positions of the pieces in the welding. Preparation of the pieces to weld.
Cost of the welding.
Automatic welding.

3. DEFECTS OF WELDING

Deformations and internal tensions in the welding.
Defects of welding.

4. ADHESIVE JOINTS

General aspects about adhesion
Contact among the phases
Pretreatment of the surfaces

5. MECHANICAL PROPERTIES OF THE ADHESIVE UNIONS

Tests to evaluate the resistance to the separation of adhesive unions
Non destructive tests

6. TYPES OF ADHESIVES

Components on the formulations

Full-or-part-time: 112h 30m

Theory classes: 35h

Laboratory classes: 10h

Self study : 67h 30m

GRADING SYSTEM
