



## Course guide

# 240EM144 - 240EM144 - Materials Joining Technologies

Last modified: 14/06/2023

**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:** 2023    **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

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### 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

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