

## Course guides

### 295022 - FP - Fundamentals of Polymers

Last modified: 03/03/2020

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

**Degree:** BACHELOR'S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Compulsory subject).

**Academic year:** 2019    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish

#### LECTURER

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**Coordinating lecturer:** MARIA LLUÏSA MASPOCH RULDUA

**Others:**

Primer quadrimestre:  
JONATHAN CAILLOUX - M21, M22  
VIOLETA DEL VALLE GARCÍA MASABET - M21, M22  
MAGALI KLOTZ - M21, M22  
MARIA LLUÏSA MASPOCH RULDUA - M21, M22  
ORLANDO ONOFRE SANTANA PEREZ - M21, M22

Segon quadrimestre:  
JONATHAN CAILLOUX - M11  
VIOLETA DEL VALLE GARCÍA MASABET - M11  
MAGALI KLOTZ - M11  
MARIA LLUÏSA MASPOCH RULDUA - M11  
ORLANDO ONOFRE SANTANA PEREZ - M11

#### PRIOR SKILLS

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General knowledge of chemistry

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

CEB-04. Understand the fundamental principles of general, organic and inorganic chemistry and apply them in engineering.

CEI-09. Understand the fundamentals of materials science, technology and chemistry. Understand the relationship between the microstructure, synthesis or processing and the properties of materials.

**Transversal:**

07 AAT N1. SELF-DIRECTED LEARNING - Level 1. Completing set tasks within established deadlines. Working with recommended information sources according to the guidelines set by lecturers.

#### TEACHING METHODOLOGY

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MD1: Expository class with material available in digital campus

MD2: Seminars and activities deliverables

MD3: Conducting laboratory practices

## LEARNING OBJECTIVES OF THE SUBJECT

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1. Review the basic concepts of organic chemistry
2. Know the main reactions of polymerization
3. Learn how to calculate and determine the average molecular mass of polymers
4. Know the polymer identification techniques

## STUDY LOAD

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Type	Hours	Percentage
Hours large group	45,0	30.00
Self study	90,0	60.00
Hours small group	15,0	10.00

**Total learning time:** 150 h

## CONTENTS

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### Principios de Química Orgánica

**Description:**

Introduction  
Main reactive groups  
Attractive forces  
Isomerías  
Main reactions

**Related activities:**

Practices with molecular models

**Full-or-part-time:** 49h 40m

Practical classes: 15h  
Laboratory classes: 2h  
Guided activities: 1h  
Self study : 31h 40m

## Polymers

### Description:

Basic definitions  
Polymerization reactions  
Molecular structure  
Polymerization systems  
Dimensions of the chain  
Identification of polymers  
Main reactions  
Dimensions of the chain  
Identification of polymers

### Related activities:

1. Viscosymmetry
2. Obtaining thermoplastics (PA6.10)
3. Preparation PU foams
- 4 Identification by flame behavior
5. IR identification

**Full-or-part-time:** 105h 20m

Practical classes: 30h

Laboratory classes: 10h

Guided activities: 2h

Self study : 63h 20m

## GRADING SYSTEM

The final mark (Nf) will be calculated according to the following table:

Type of evaluation: Continuous evaluation

Note deliverable activities (A) = 10%

Lab note (P) = 20%

Final Exam (EF) = 70%

Final mark (Nf):  $0.1 A + 0.2 P + 0.7 EF$

The re-evaluation replaces the final exam grade. To be able to submit to the re-evaluation, it is necessary to have attended all the laboratory practices and submitted the corresponding reports.

## BIBLIOGRAPHY

### Basic:

- Bruice, Paula Yurkanis. Organic chemistry : study guide and solutions manual. Harlow, England: Pearson, 2017. ISBN 9781292160436.

- Callister, William D. Introducción a la ciencia e ingeniería de los materiales. Barcelona [etc.]: Reverté, 1995-1996. ISBN 842917253X.

## RESOURCES

### Other resources:

Presentations of the classes available in atenea

Practice script available at atenea

Script of the activities available in atenea