29941 - Polymerization Reactions

Información del Plan Docente

Academic Year	2018/19
Subject	29941 - Polymerization Reactions
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	435 - Bachelor's Degree in Chemical Engineering
ECTS	6.0
Year	4
Semester	Second semester
Subject Type	Optional
Module	---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process that has been designed for this subject is based on the following:

The learning process will take place at several levels: masterclasses, problem solving (case studies) and practical work, deliverables and oral presentations. They will require a progressive increase in student participation. Masterclasses will provide the theoretical basis that makes up the subject as well as solutions for key exercises. Practical cases, problem-solving sessions and practical work constitute an effective complement to masterclasses. The combination of both practical and theoretical sessions will provide the student a more applied and critical point of view. The deliverables (essays) will constitute the most important part of the evaluation in which the student will establish the basis of their academic success.

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4.2.Learning tasks

Lecture and theory session (30 h). Materclasses will provide the theoretical basis of the different proposed subjects and key problem examples will be resolved. During the **practical cases attendance**- based sessions (10 h) the students will solve problems supervised by the lecturers. Problems and/or case studies will be related to the theoretical aspects explained during the masterclasses.

Practice session (20 h): 5 sessions of 4 hours each, which will be directly related to the subjects explained during the masterclasses and problem-solving sessions.

Assignments (22 h). Student will have to submit a written essay and an oral presentation. Work will be carried out throughout the semester and it will be supervised and evaluated by the lecturer.

Autonomous work and study (65 h). We strongly recommend the students to carry out individual study in a continuous manner during the semester.

Assessment (3 h). Students will perform a final examination with supporting material (books and notes). The students will show, individually, the acquired theoretical and practical skills, as well as their ability to develop critical thinking in specific questions related to the different subjects.

4.3.Syllabus

Sessions calendar and essays submission

Masterclasses and problem-solving sessions will be held according to the EINA schedule.

Each teacher will inform about the tutorial session schedules. The module's program is the following:

The masterclasses, problems solving and practical cases

Chapter 1. General introduction (1 h).

Chapter 2. Polymerization process (16 h)

Chapter 3. Products obtained by different polymerization process (3 h)

Chapter 4. Reactor configuration (3 h).

Chapter 5. Polymers properties (5 h).

Chapter 6. Compound formulation (2 h).

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Chapter 7. Problems (10 h).

Laboratory

- **Practice 1**. Conventional *Vs* controlled radical polymerization. TEMPO (persistent radical) mediated polymerization of styrene (4 h).
- **Practice 2**. Synthesis of graft copolymers of unsaturated polyester and styrene**.** Preparation of laminated composites of unsaturated polyester reinforced with biodegradable cellulosic fibers (4 h).
- **Practice 3**. Preparation of thermoset polyurethanes and elastomeric polyurethanes. Flexible and rigid polyurethane foams (4h).
- **Practice 4**. Chemical modification of cellulose. Acetylation and deacetylation of cellulosic fibers. Characterization of cellulose acetates and preparation of polymeric membranes and oil sorbent materials (4 h).
- **Practice 5**. Water soluble polymers of industrial relevance. Preparation of polyvinyl alcohol, alginate and chitosan based hydrogels (4 h).

4.4.Course planning and calendar

Sessions and oral presentations schedule

Master classes and problem-solving sessions are held according to the EINA schedule.

Each teacher will inform the student about the tutorial session schedules.

4.5.Bibliography and recommended resources