

Advanced Polymer Processing Techniques and Optimization by Computer-aided Simulation

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European credits ECTS: 4,5

Teaching Language: Spanish (English Friendly Course)

Supporting files: Spanish and English

	Number of course slots (1h)	Number of course slots (1h)
Magisterial	20	
Seminars	3	
Practical (Laboratory+Computer)		10+12

Description

The course starts with a brief introduction to the main processing techniques for polymeric materials. The next chapters deal with the recent advances and current trends in polymer processing. The processing of elastomeric materials is specifically studied in one independent chapter. Finally, the course includes a module about the computer-aided optimization of the injection molding process, as an example, by means of a Computer Aided Engineering (CAE) simulation software. There are laboratory sessions to practice with the corresponding instrumental techniques and practical sessions dealing with the simulation software.

- To get knowledge on the use, interpretation and communication of the results obtained through simulation software of the processing of polymeric materials.
- To gain knowledge on the state-of-the-art processing techniques of polymeric materials.
- To know the most suitable industrial processing technique for each type of polymeric material and/or for the fabrication of polymeric parts.

Outline

Part 1: Fundamentals of transformation techniques of polymeric materials

Part 2: Processing-structure relationship in injection-molding, extrusion and other transformation techniques

Part 3: Advances in injection-molding

Fluid assisted injection

Structural foams

Overmolding

Molding with lost core
Injection-compression
Microcellular foams

Part 4: Advances in blow-molding

Deep-draw
3D blow-molding
Sequential molding

Part 5: Innovations and advanced extrusion techniques

Thermoconforming
Rotational molding

Part 6: Processing of elastomeric materials

Formulation
Mixing
Conforming

Part 7. Computer assisted injection-molding simulation

Introduction to finite elements software
Materials and processing information needed for the simulation
Simulation
Results and discussion of the simulation

Experimental practical contents

Software simulation training sessions.
Comparison between experimental injection molding and software simulation.
Processing of elastomeric materials.
Blown film extrusion.