Module Description

Polymer Degradation and Stabilisation

General Information

Number of ECTS Credits

3

Abbreviation

TSM_PolyDegr

Version

2016.03.17

Responsible of module

Andrea Castrovinci, SUPSI

Language

	Lausanne	Bern	Zürich	Lugano/Manno
Instruction	☐ E ☐ F	☐ D ☐ E ☐ F	☐ D ☐ E	☒ E
Documentation	☐ E ☐ F	☐ D ☐ E ☐ F	☐ D ☐ E	☒ E
Examination	☐ E ☐ F	☐ D ☐ E ☐ F	☐ D ☐ E	☒ E

Module category

☐ Fundamental theoretical principles
☒ Technical/scientific specialization module
☐ Context module

Lessons

☒ 2 lecture periods and 1 tutorial period per week
☐ 2 lecture periods per week

Brief course description of module objectives and content

The course analyses the mechanisms of polymer degradation. The technologies to protect polymeric materials or, alternatively, to exploit degradation of macromolecules in technological applications are also presented. The final object of the course is to provide the students with the know-how to design polymeric materials taking into the due account the degradation issue. Degradation and stabilisation of polymeric materials are related to reactions occur during processing, when polymers are subjected to heat, oxygen and mechanical stress, and during the useful life of the materials when oxygen and sunlight are the most important degradative factors. In more specialised applications, degradation may be induced by high energy radiation, ozone, atmospheric pollutants, mechanical stress, biological action, hydrolysis and many other influences. All these technological scenario have in common certain basic chemical reactions. The course presents and analyses all the aspects of these processes.

Aims, content, methods

Learning objectives and acquired competencies

Understand the chemicophysical processes of degradation of polymeric materials
Master the possible approaches to protect polymeric materials from uncontrolled degradation
Study the technological exploitation of polymer degradation (e.g. biodegradation, composting, etc.)

Contents of module with emphasis on teaching content

The course content will be focused on:

- Specific degradation factors (Thermal degradation, Mechanical degradation, Oxidation, Photodegradation, biodegradation)
- Degradation of polymer during processing
- Weathering of polymers
- Strategies to protect polymeric materials aging uncontrolled degradation
- Combustion of Polymeric materials and Flame retardancy

Teaching and learning methods

Teaching: Ex cathedra teaching (theory) and Presentation of case studies

Learing methods: Self study

Prerequisites, previous knowledge, entrance competencies

Fundamentals of Inorganic and Organic chemistry.

Fundamental of polymeric materials

Literature

Assessment

Certification requirements for final examinations (conditions for attestation)

Written module examination

Duration of exam :	120 minutes
Permissible aids:	none