

**Module Description, available in: EN**

## *Plastics failure analysis and prevention*

### General Information

**Number of ECTS Credits**

3

**Module code**

TSM\_PlaFaAna

**Valid for academic year**

2024-25

**Last modification**

2019-08-31

**Coordinator of the module**

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**Explanations regarding the language definitions for each location:**

- Instruction is given in the language defined below for each location/each time the module is held.
- Documentation is available in the languages defined below. Where documents are in several languages, the percentage distribution is shown (100% = all the documentation).
- The examination is available 100% in the languages shown for each location/each time it is held.

|                      | Lausanne |  |  | Lugano   | Zurich |  |  |
|----------------------|----------|--|--|----------|--------|--|--|
| <b>Instruction</b>   |          |  |  | X E 100% |        |  |  |
| <b>Documentation</b> |          |  |  | X E 100% |        |  |  |
| <b>Examination</b>   |          |  |  | X E 100% |        |  |  |

**Module Category**

TSM Technical scientific module

**Lessons**

2 lecture periods and 1 tutorial period per week

### Entry level competences

**Prerequisites, previous knowledge**

Fundamentals of Inorganic and Organic chemistry.  
Fundamental of polymeric materials

### Brief course description of module objectives and content

Degradation of polymers is an important driver of plastic and rubber products failures during their service life. Therefore, understanding the mechanisms of polymer degradation is of paramount importance for properly engineering plastic and rubber products, ensuring performances all through their service life. This module discusses the impact of chemical and physical degradating factors on the macromolecules characteristics and performances. It provides fundamentals of macromolecule degradation mechanisms, correlating this know-how with the failure of plastic and rubber products through case study analysis.

## Aims, content, methods

### Learning objectives and competencies to be acquired

Understand the chemical-physical processes of degradation of polymeric materials.

Master the possible approaches to protect polymeric materials from uncontrolled degradation.

### Module content with weighting of different components

The course content are:

- Impact of degradation factors (e.g. oxygen, UV, etc.) on macromolecules
- Impact of macromolecule degradation on mechanical/optical/chemical properties of plastic/rubber products
- Protection of plastic/rubber product against degradation

### Teaching and learning methods

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

Learning methods: Self study

### Literature

## Assessment

### Certification requirements

Module does not use certification requirements

### Basic principle for exams

**As a rule, all standard final exams are conducted in written form. For resit exams, lecturers will communicate the exam format (written/oral) together with the exam schedule.**

### Standard final exam for a module and written resit exam

Kind of exam

Written exam

Duration of exam

120 minutes

Permissible aids

No aids permitted

### Special case: Resit exam as oral exam

Kind of exam

Oral exam

Duration of exam

30 minutes

Permissible aids

No aids permitted