Course Specifications
Valid as from the academic year 2019-2020

Chemistry and Technology of Polymers (1002512)

Course size
(nominal values; actual values may depend on programme)
Credits 5.0
Study time 150 h
Contact hrs 50.0 h

Course offerings and teaching methods in academic year 2019-2020
A (semester 1) Dutch
lecture 25.0 h
guided self-study 5.0 h
practicum 10.0 h
excursion 10.0 h

Lecturers in academic year 2019-2020
Stevens, Christian LA24 lecturer-in-charge

Offered in the following programmes in 2019-2020
Bachelor of Science in Bioscience Engineering (main subject Chemistry and Food Technology)
crds offering
5 A

Teaching languages
Dutch

Keywords
Synthesis, kinetics, rheology, characteristics, shaping, recycling of polymers

Position of the course
The objective of the course consists of the classification of the different kinds of polymers and the study of the synthetic methods to produce the polymers. Further, the physical and mechanical properties of the polymers, the characteristics, the morphology and the rheology are discussed in connection with the technological implications. The course needs to give a general overview of the domain of polymer chemistry to the students and needs to make them familiar with the underlying chemical and technological aspects.

Contents
1. Introduction
   1.1. Definitions
   1.2. Overview (economical importance)
2. Synthetic Methods
   2.1. Stepwise polymerisation
   2.2. Chain polymerisation
      · Radical polymerisation
      · Ionic and coordination polymerisation (transition metal chemistry)
      · Co-polymerisation
3. Features
   3.1. Solubility
   3.2. Physico-chemical features
   3.3. Mechanical properties
4. Analysis of polymers
5. Design of polymers (extrusion, moulding...)
6. Specific Applications
   6.1. Packaging
   6.2. Adhesives and coatings
   6.3. Composite materials
7. Recycling
8. New type polymers
dendrimers and liquid crystals

(Approved)
Initial competences
Polymer Chemistry builds on certain learning outcomes of course units Chemistry 3: Organic chemistry - structure, and Chemistry 4: Organic chemistry - reactivity; or the learning outcomes have been achieved differently. No specific knowledge of polymer chemistry required.

Final competences
1. To have a general overview on the field of polymer chemistry and of the importance of the sector for society
2. To have a profound knowledge on the synthetic procedures to produce polymers and the general principles to produce polymers with certain characteristics
3. To be knowledgeable on the kinetics of polymerisation reactions
4. To have a good view on the applications of polymers
5. To be familiar with the basic concepts of polymer recycling
6. To have a view on the recent developments in the polymer industry

Conditions for credit contract
Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract
This course unit cannot be taken via an exam contract

Teaching methods
Guided self-study, excursion, group work, lecture, practicum

Extra information on the teaching methods
Lectures: 24 hours
Guided self-learning: 6 hours
Practical exercises: 12 hours
Excursions: 8 hours

Learning materials and price
Course material is available

References
Included in the lecturing material

Course content-related study coaching
The study coaching will be taken care of by the teaching assistants of the department.

Evaluation methods
end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period
Written examination with open questions, written examination

Examination methods in case of periodic evaluation during the second examination period
Written examination with open questions, written examination

Examination methods in case of permanent evaluation
Job performance assessment, report

Possibilities of retake in case of permanent evaluation
Examination during the second examination period is possible

Calculation of the examination mark
Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.

Facilities for Working Students
Students are not obliged to attend the lectures. The practical excercises and the excursions are obligatory.

(Approved)