

Polymer and Composite Materials (E725017)

Course size (nominal values; actual values may depend on programme)

Credits 4.0 Study time 120 h Contact hrs 42.0 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 2)	Dutch	practicum	18.0 h
		lecture	24.0 h
B (semester 2)		lecture	24.0 h
		practicum	12.0 h

Lecturers in academic year 2018-2019

Ragaert, Kim	TW11	lecturer-in-charge
Delva, Laurens	TW11	co-lecturer

Offered in the following programmes in 2018-2019

	crdts	offering
Master of Science in Chemical Engineering Technology	4	A
Master of Science in Electromechanical Engineering Technology	3	B

Teaching languages

Dutch

Keywords

polymers, composites, additives, characterization

Position of the course

Partim materials

The student is taught how to select polymer and composite materials based on important properties which can be very diverse. He will be guided by application circumstances of the final product, processing methods, but also by economical factors and environmental issues. The adequate choice of an additive will also contribute to the tailoring of the material's properties.

Partim characterization

The student is taught why and how tests can be performed. Physical, physical-chemical and morphological tests alike will be discussed. The student learns how to evaluate the results, based on international standards.

Partim industrial applications

Above partims are applied to different industrial relevant applications with attention for the latest trends in the world of polymers and composites.

Contents

Partim materials

A list of common polymer and composite materials, their use and additives is made available in the form of a reference book. Using this reference book, the student learns to make choices of materials and case studies are developed.

Partim characterization

The different characterization methods (and their theoretical fundamentals) for determination of physico-chemical and morphological properties of polymers and composite materials are discussed. This includes: DSC, IR, TGA, GPC, DMA, rheology and structural morphology. During the practicum, the student will perform these tests and/or discuss and analyze test results.

Partim industrial applications

Above partims are applied to industrial relevant case-studies on the topics of packaging

technology for food applications and the recycling of polymers and composites. The student learns to what extent polymers and composite materials are recyclable and what are the properties and processing behavior of this recycled materials.

Initial competences

- Materials (1Ba)
- for EM: Applied Material Sciencesb (3Ba EM)
- for CH: Polymers (3Ba CH)

Final competences

- 1 To be able to acquire advanced disciplinary technological knowledge and to master specific practical skills.
Among other things: starting from material and raw material knowledge, fabrication methods, economical factors and environmental impact, presenting of proposals for applications of polymers and composites.
- 2 To be able to perform analysis and to apply this to process and product control e. g. during practical exercises "quality control of polymers".
- 3 To be able to implement and to develop research methods and research techniques in an effective way e.g. during practical work for the exercises.
- 4 To be able to think, to judge and to act permanently in a critical, creative and scientific way.
Among other things: related to the yes or no use of polymers, rubbers and composites in certain applications (general material knowledge).
- 5 To be able to cooperate in a multidisciplinary environment (materials, physics, chemistry, elektromechanics).
- 6 To be able to cooperate in a multidisciplinary environment (materials, physics, chemistry, elektromechanics).
- 7 To be able to implement scientific insights on complex engineering technical problems e.g. realisations in polymers or composites..
- 8 To be able to get acquainted with, to assimilate, to implement and to use new relevant technologies and/or theories

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

Lecture, practicum

Learning materials and price

Syllabus and hand-outs

Extra (facultative) literature: see reference list in syllabus and cited references in the hand-outs.

References

Course content-related study coaching

Appointments can be made with the lecturers for additional information with respect to the course and feedback on the evaluation

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Open book examination, oral examination

Examination methods in case of periodic evaluation during the second examination period

Open book examination, oral examination

Examination methods in case of permanent evaluation

Participation, report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods

Periodic evaluation: oral examination with written preparation, which is (limited) open book

Permanent evaluation: participation during practical, report, presentation
E725017A (CH): Additional group work evaluated by a report

Calculation of the examination mark

A weighted average is used to compute the final score for a training item.

Exam (70%)

Practicum (30%)

However, if a student gains a score of 7 or less on 20 on one of the different parts of this course, this indicates that his skill for certain subcompetencies is insufficient. Consequently, the examiners can deviate from the arithmetical calculation of the final marking of a training item and use another marking in mutual consensus.