Course Specifications
Valid as from the academic year 2016-2017

Deze cursus is 2-jaarlijks en wordt niet aangeboden

Lecturers in academic year 2017-2018
Dubruel, Peter
WE07 lecturer-in-charge

Offered in the following programmes in 2017-2018

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Teaching languages
English

Keywords
Polymer materials, bio-related applications, techniques for the production, modification and characterisation of polymer materials

Position of the course
The course unit, which is part of the Master’s programme in Chemistry, aims to introduce the students into the wide spectrum of bio-related applications of polymer materials (biomaterials, biosensors, biofiltration,...). During the course, a wide range of topics will be discussed to enable the student to master the current applications, production- and analysis techniques of this class of materials. In addition, the advantages, disadvantages and limitations of the current generation polymer materials will be summarised. Finally, an overview will be given of some examples where the combination of polymer materials with other materials leads to more performing materials.

Contents
Overview of bio-related applications of polymers: biomaterials, biosensors, biofiltration,... Synthesis of starting polymers for bio-applications Production techniques for polymer materials: solvent casting, photo polymerisation, rapid prototyping, electrospinning, Surface modification of polymer materials: grafting from, grafting onto, plasma treatment, ... Surface characterisation of polymer materials for bio-applications: surface composition (XPS, IR imaging), surface topography/roughness (AFM, SEM), surface energy (DCA, SCA), Study of interactions between polymer materials and the biological environment: SPR, QCM, in vitro models to mimic the biological in vivo environment, ...

Initial competences
In the Bachelor’s programme, the student has been introduced into the concepts of general chemistry, organic chemistry, physico-chemistry, cell biology and polymer chemistry. These courses are the basis to master a wide range of bio-related applications of polymers.

Final competences
1 A detailed understanding and knowledge on the wide spectrum of bio-related applications of polymers. Understanding of structure-property relations of different polymer classes.
2 Knowledge of classical and more recent techniques to produce polymers for bio-related applications.
3 Knowledge of techniques for the surface modification and characterisation of
polymer materials for bio-related applications. Knowledge of techniques used for studying in real time the interaction between polymer materials and the biological environment.

**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

**Learning materials and price**
The English course material will be provided to the students at the beginning of the course.

**References**
- Biosensors (The Practical Approach Series), Jon Cooper, Tony Cass.

**Course content-related study coaching**
The students permanently have the possibility to raise questions, either during the lessons or on a scheduled moment.

**Evaluation methods**
end-of-term evaluation and continuous assessment

**Examination methods in case of periodic evaluation during the first examination period**
Written examination, oral examination

**Examination methods in case of periodic evaluation during the second examination period**
Written examination, oral examination

**Examination methods in case of permanent evaluation**

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

**Extra information on the examination methods**
The evaluation includes an oral exam with written preparation on the content of the course and lectures.

**Calculation of the examination mark**

(Approved)