Course Specifications
Valid as from the academic year 2015-2016

Course size (nominal values; actual values may depend on programme)
- Credits: 3.0
- Study time: 90 h
- Contact hrs: 36.0 h

Course offerings and teaching methods in academic year 2017-2018
- A (semester 2)
  - Practicum: 20.0 h
  - Lecture: 15.0 h

Lecturers in academic year 2017-2018
- Cardon, Ludwig
  - TW11 lecturer-in-charge

Offered in the following programmes in 2017-2018
- Master of Science in Chemistry: 3 credits, A offering
- Exchange Programme in Chemistry (master's level): 3 credits, A offering

Teaching languages
- English

Keywords
- Polymer processing, injection moulding, extrusion, thermoforming, thermosets, calander, quality control.

Position of the course

**partim "polymer processing" (lecture):**
The students will become aware of the polymer processing technologies such as injection moulding, extrusion, calander, film blow extrusion, stretch blow moulding, thermoforming and thermoset processing, to which all facts affecting the processing will be discussed in detail. Further on, the functional parts of the machines will be discussed in relation to rheological behaviour of several polymers. Other techniques such as behaviour of polymers will be discussed.

**partim "polymer processing" (practicum):**
During the practical exercises, the students will be trained on the internal available processing equipment (specially injection moulding and extrusion of plates/foils/..., extrusion blow moulding, thermoforming, thermoset presses, ...), this all related to the polymer. Indirectly, attention will be spend on maintenance and security of the machines, quality assurance, measuring techniques with means such as sensor measurements, IR analyses and weight.

Contents

**Lecture**
Injection moulding: the technology (machine, process and process conditions and the relation towards moulds), product design, post processing, quality control. Extrusion: the technology (machine, process and extrusion line machine elements), production costs, the several variants (extrusion of profiles, films, foils, bottles,...). Explanation on other techniques such as calander, casting techniques, thermoforming, expanded polymers, processing of thermosets.

**Practicum/project**
During practicum, the student learns to understand the polymer processing methods such as Injection moulding (several circumstances), extrusion (tube, foils, plates, blow moulding), other techniques (thermoforming), processing of thermosets. Quality assurance on the produced parts. During the project work, via technical and academic literature a process will be analysed in detail.

**Initial competences**
The student must know basics of polymers and general characteristics of materials.
Final competences
1 To be able to acquire advanced disciplinary technological knowledge and to master 1 specific practical skills. 
   Among other things:
   1 from material- and polymer knowledge, design possibilities, fabrication possibilities 
   2 economical, factors and environmental-impact to be able to propose adequate application possibilities 
2 To be able to design and monitor industrial production processes;
   Among other things:
   1 impact of polymer, mould design, production process, automation and materials. 
   2 application of sensor measurements as for control of the production process. 
3 To be able to implement research methods and research techniques in an effective 1 way even within an uncertain context e.g. when fulfilling the exercises in the laboratories. 
4 To be able to implement scientific insights on scientific and/or engineering problems, 1 independently and in a team. 
5 To be able to assimilate, to implement and to use relevant existing and new technologies and/or theories (AIC2); e.g. development of complex processing parameters in relation to the final product quality.

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

Extra information on the teaching methods
The lectures are used to teach the theoretical background complemented with some practical examples/case studies. 
During the practicum the processing technologies are explained and applied by its own.

Learning materials and price
Syllabus (handouts); electronically available via Minerva (https://minerva.ugent.be)
Clarification, background information and demonstrations, given during the classes, must be noted by the students and are part of the course material.
Extra (facultative) literature: see reference list in the course material and mentioned books/papers.

References

Course content-related study coaching
Students can, after an appointment, individual or group, meet the teacher for extra explanation. 
During practica, the students will be guided and will have possibility to ask extra information.

Evaluation methods
end-of-term evaluation and continuous assessment

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

Examination methods in case of periodic evaluation during the second examination period
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 not possible

Extra information on the examination methods
Theory: oral exam with written preparation at the end of the course: open questions related to the course and notes. 
Practicum: permanent evaluation, reports.

Calculation of the examination mark
Theory/laboratory: 60/40%
A weighted average is used to compute the final score for a training item. However, if a
student gains a score of 7 or less 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. Of course, the examiners may judge that the arithmetic calculation mentioned in the study index card can also be used for 7 or less. For each deviation, a detailed motivation must be drawn up. In that case it must be pointed out that the skill for this subcompetence is proven to be insufficient, if the student did not pass a examination part considered to be important for certain subcompetences.