Course Specifications
Valid as from the academic year 2018-2019

Colloid and Surface Chemistry (I000546)

Course

Course offerings and teaching methods in academic year 2019-2020

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (semester 2)</td>
<td>5.0</td>
<td>135 h</td>
<td>60.0 h</td>
</tr>
</tbody>
</table>

Guided self-study: 10.0 h
Lecture: plenary exercises: 1.25 h
Seminar: coached exercises: 3.75 h
Seminar: practical PC room classes: 12.5 h
Practicum: 12.5 h
Lecture: 20.0 h

Lecturers in academic year 2019-2020

Van der Meeren, Paul
LA24 lecturer-in-charge

Offered in the following programmes in 2019-2020

<table>
<thead>
<tr>
<th>Programme</th>
<th>Credits</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Science in Bioscience Engineering: Chemistry and Bioprocess Technology</td>
<td>5</td>
<td>A</td>
</tr>
<tr>
<td>Master of Science in Bioscience Engineering: Food Science and Nutrition</td>
<td>5</td>
<td>A</td>
</tr>
</tbody>
</table>

Teaching languages

Dutch

Keywords

Colloids, surfaces, dispersions, stability

Position of the course

This course describes the special properties of colloidal systems; the latter are products that are characterised by the fact that their surface characteristics are more important than the bulk properties. The course not only aims to understand the fundamental origin of colloidal properties and surface phenomena, but also tries to explain their impact upon technological processes. The practical exercises aims to learn the student how to experimentally determine the major parameters of the models described in the theoretical part.

Contents

1. Introductory concepts: colloids & interaction forces
2. Surface and interfacial science
   2.1. Solid/gas interface: adsorption
   2.2. Liquid interfaces: surface tension & capillarity
   2.3. Adsorption at liquid interfaces; association colloids
   2.4. Solid/liquid interface: wetting & porosimetry
3. Emulsification and high pressure homogenisation
4. Collision theory: ortho- and perikinetic flocculation
5. Electrostatic stabilisation: EDL & DLVO theory
6. Electrokinetics: the zeta potential
7. Interactions with hydrophilic macromolecules
   7.1. Steric stabilisation
   7.2. Charge neutralisation and bridging
   7.3. Depletion flocculation
8. Introduction to rheology

(Approved)
Initial competences

Basic knowledge of chemistry, physics and mathematics

Final competences

1. Knowledge of basic phenomena influencing the preparation, characterisation and stabilisation of disperse systems such as emulsions, suspensions and porous particles
2. Apply this knowledge to explain experimental observations, based on theoretical grounds
3. Quantitative application of this knowledge (using calculations and simple simulations with Excel)

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, lecture, practicum, lecture: plenary exercises, seminar: coached exercises, seminar: practical PC room classes

Extra information on the teaching methods

- Theory: oral lectures
- Exercises: PC-exercises + laboratory experiments

Learning materials and price

Course notes are available Cost: 15 EUR

References

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Course content-related study coaching

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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, open book examination, oral examination

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

Written examination with open questions, open book examination, oral examination

Examination methods in case of permanent evaluation

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

- Theory: period aligned evaluation
- Exercises: period aligned and non-period aligned evaluation

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.
- Theory: oral (open book) examination after written preparation
- Exercises: oral (open book) examination after written preparation; assessment of lab reports

Calculation of the examination mark

One fourth of the final score is based on permanent evaluation (lab reports), whereas three fourths is based on the period-aligned evaluation (oral examination).