

2019/20 Undergraduate Module Guide

Chemistry 2

ECTS credit: 6

Total number of student hours: 150

Code: 25151105

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Taught: Semester 2

Year running: 2019/20

Co-requisites: 25151104 Química 1 (Chemistry 1)

MODULE DESCRIPTION

Objectives

On completion of this module, students will be familiar with the chemical principles relevant to any agricultural engineer and will gain an understanding of how to use thermodynamic and equilibrium data to calculate specific features of a given reaction. The relevance to specific areas of agricultural engineering will be described. Specifically, this course introduces students to aqueous equilibria, electrochemistry, coordination compounds and organic chemistry.

Syllabus

- Acids and Bases: concepts of strong/weak acids/bases, water and pH, acid-base reactions, buffer solutions;

- Solubility Equilibria: common-ion effect, predicting precipitation, selective precipitation, complex ion formation;
- Electrochemistry: redox reactions, electrode potentials, half-cells, Nernst equation, electrolysis, corrosion;
- Coordination Compounds: coordination complex formation, isomerism, electronic structure;
- Organic Chemistry: main functional groups, nomenclature, general reactions.

Skills

On completion of the course, students should have achieved the following skills:

Basic skills:

- CB2: applying knowledge;
- CB4: capability to communicate and social competence;
- CB5: ability for learning.

Transversal skills:

- UAL1: basic knowledge of the profession (to be completed with specific skills);
- UAL2: ability in the use of ICT;
- UAL3: capability for solving problems;
- UAL4: oral and written communication;
- UAL6: teamwork;
- UAL9: capability to learn to work independently.

Specific skills:

- CB04: basic knowledge in general chemistry, organic and inorganic chemistry and its applications in engineering.

Private study

Reading assignments of supporting textbooks

Review of textbooks and in-class notes

Weekly viewing of laboratory videos for preparation of practices

Completion of weekly formative activities

Preparation for practices and seminars

Revision for written examinations, questionnaires, and in-class tests

Progress monitoring

Tests on reading assignments from the study guide
Questionnaires
Teamwork problem-solving
Laboratory reports
Oral test on laboratory work
Homework and assignments
Partial exams and/or formal written exam

Assignments

Recommended reading is listed below and will be described in detail at the beginning of the course through a study guide. Additional reading lists may be announced occasionally in class and via the eLearning Platform.

Homework assignments will be announced with sufficient notice. **No late homework will be accepted.**

Preparation of practices and watching the specific videos for practice preparation is **compulsory**, so students should solve any visualisation-related problems they might encounter well in advance.

Written Exams

There will be two 2-h partial exams and/or one 3-h formal exam. Partial exams will be done during lecture hours. The formal exam will be done during Summer Examination period. All written exams are in English.

Assessment (percentages may vary slightly as coursework develops)

Coursework

| Assessment type | Notes | % of formal assessment | Skills assessed |
|--|---|------------------------|--|
| In-class activities and other activities | Tests on reading assignments, questionnaires, team work, and homework assignments | 20.00 | CB2 CB5 UAL3 UAL6 UAL9 |
| | Seminar work, laboratory work and laboratory reports ¹ | 20.00 | CB4 CB5 UAL1 UAL4 UAL6 UAL9 |
| Total percentage (Assessment Coursework) | | 40.00 | |

Exams

| Exam type | Exam duration | % of formal assessment | Skills assessed |
|------------------------------------|---------------|------------------------|-------------------------------------|
| Laboratory exams and attendance | 1 h | 10.00 | CB2 UAL1 UAL3 UAL4 CB04 |
| Partial/Formal exams | 2/3 h | 50.00 | CB2 UAL1 UAL3 UAL4 CB04 |
| Total percentage (Assessment Exam) | | 60.00 | |

¹A lack of data treatment in one or more reports means that students might have to do a written exam of lab data treatment as part of the formal (final) exam.

²10 points out of 10 in the written and oral laboratory exams is a requirement to pass this course.

The **final mark** for this course is calculated as the weighted average, provided that all the passing requirements are met. The **passing mark** is 5 out of 10 points.

The assessment percentages described above will be applied under every circumstance.

Non-attending students are advised that the assessment type that **cannot be overcome** by coming to a formal exam is: *In-class activities and other activities (Coursework)*. Therefore, these students can only achieve a maximum final mark of the course of 6 points out of 10 through a formal examination.

Attending students must reach a minimum average mark of 4 points out of 10 in written exams in order to calculate the weighted average final mark. The **final mark** for this course is calculated as the weighted average, provided that all the passing requirements are met. Attendance to each laboratory/seminar session is compulsory in order to accept the corresponding laboratory/seminar reports, and attendance to 80% of the laboratory and seminar sessions is compulsory in order to consider this assessment percentage in the calculation of the weighted average. For a maximum of two non-attendances to practices that are adequately justified (medical documents, etc.) the corresponding works that are handed in by the students will be taken into account for assessment. For students with more than two justified non-attendances to practices an additional requirement is that, as long they have reached the passing requirements in written and laboratory exams, they will have to pass a practical exam in the laboratory in order to take into account the corresponding reports handed in by the students during the course. Students should consult the Laboratory Supervisor of the course in advance to learn in which cases may non-attendances be considered adequately justified.

Any further specifics on Assessment will be described in detail during the Opening Lecture and will be published in the eLearning Platform.

Bibliography

Recommended reading:

- [Chemical principles. The quest for insight](#). Peter Atkins, Loretta Jones, Leroy Laverman. W.H. Freeman & Co. 2016. 7th Edition.

Supplementary texts:

- [Analytical chemistry](#). Gary D. Christian. John Wiley & Sons. 2004.

- [Chemistry in the laboratory](#). Postma, Roberts and Hollenberg. W.H. Freeman & Co. 2000.