

# 2015/16 Undergraduate Module Guide

## Chemistry 2

**ECTS credit:** 6

**Code:** 25101105

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**Taught:** Semester 2

**Year:** 2015/16

**Co-requisites:** 25101104 (Química 1)

**This module is not approved as an elective**

### 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 of this 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;

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- 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:

General skills:

- CB1: to be able to demonstrate knowledge and understanding in a field of study that is based on the foundations of secondary education, and is generally at a level that includes some aspects that imply cutting-edge knowledge of their field of study, although it is also supported by advanced textbooks.
- CB2: to be able to apply their knowledge to their work or vocation in a professional way and to have achieved the skills that can usually be demonstrated through the development and support of arguments and solving problems within their field of study.
- CB3: to be able to gather and interpret relevant data (usually within their field of study) in order to express opinions that include reflections on relevant social, scientific or ethical topics.
- CB4: to be able to communicate information, ideas, problems and solutions to both specialized and non specialized audience.
- CB5: to have developed the learning skills necessary to undertake further studies with a high level of autonomy.

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.

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Specific skills:

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

### Learning and Teaching Methods

Delivery type	Number	Hours per lecture	Student hours
Lecture	13	2.00	26.00
Tutorial	At leisure	-	-
Laboratory	9	2.00	18.00
Independent online learning hours			20.00
Private study hours			85.00
Programmed total contact hours			45.00
Total number of hours			150.00

### Private study

Reading assignments of supporting textbook  
Review of textbook and in-class notes  
Weekly viewing of laboratory videos for practice preparation  
Completion of weekly formative activities  
Preparation for practices and seminars  
Revision for written examinations and quizzes

### Progress monitoring

Tests on reading assignments from the study guide  
Questionnaires  
Teamwork problem solving  
Laboratory reports  
Oral test regarding laboratory work  
Appointed homework assignments using PowerPoint (or compatible equivalent)  
Partial exams/Formal written exams in English or partly in English

### Assignments

Recommended reading is listed below and will be described in detail during the course (study guide). Additional reading lists may be announced occasionally in class and WebCT.

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

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

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## Written Exams

There will be two 2-h partial exams and 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 will be done in English or partly in English.

## Assessment (percentages may vary slightly as coursework develops)

### Coursework

Assessment type	Notes	% of formal assessment
In-class activities and other activities	Tests on reading assignments, questionnaires, team work, homework assignments and appointed homework	20.00
	Seminar work, laboratory reports and laboratory work <sup>2</sup>	20.00
Total percentage (Assessment Coursework)		40.00

### Exams

Exam type	Exam duration	% of formal assessment
Laboratory exams and attendance <sup>2</sup>	1 h	10.00
Partial/Formal exams <sup>3</sup>	2/3 h	50.00
Total percentage (Assessment Exam)		60.00

<sup>1</sup> 10 points out of 10 in the written and oral laboratory exams are requirements to pass this module

<sup>2</sup> Attendance to laboratory sessions and seminars is compulsory.

<sup>3</sup> A minimum of 5 points out of 10 in written exams is required to pass this course.

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

## Bibliography

Recommended reading:

- [Chemical principles. The quest for insight](#). Atkins and Jones. W.H. Freeman & Co. 2010.

Supplementary texts:

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

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

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