Universitat de Lleida

DEGREE CURRICULUM

EXPERIMENTATION IN CHEMICAL AND CHEMICAL ENGINEERING II

Coordination: CUADROS DOMÈNECH, ROSA

Academic year 2019-20

2019-20

Subject's general information

Subject name	EXPERIMENTATION IN CHEMICAL AND CHEMICAL ENGINEERING II
Code	102343
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	Degree: Not informed; Course: 3; Character: COMPULSORY; Modality: Attendance-based
Course number of credits (ECTS)	6
Type of activity, credits, and groups	Activity type: PRALAB / TEORIA Number of credits: 5.5 / 0.5 Number of groups: 1 / 1
Coordination	CUADROS DOMÈNECH, ROSA
Department	COMPUTER SCIENCE AND INDUSTRIAL ENGINEERING
Teaching load distribution between lectures and independent student work	Laboratory activities 60 hours Independent study work 90 hours
Important information on data processing	Consult this link for more information.
Language	catalan
Distribution of credits	0,5 THEORY 5,5 PRALAB

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CUADROS DOMÈNECH, ROSA	rosa.cuadros@udl.cat	5,8	
OLLÉ OTERO, LLUÍS	lluis.olle@udl.cat	5,7	

Subject's extra information

It is **COMPULSORY** that the students bring the following elements of individual protection (EPI) to the practices at the laboratory.

- Laboratory gown from UdL
- Protection glasses
- Mechanical protection gloves

They can be purchased through the shop Údels of the UdL:

C/ Jaume II, 67 baixos
Centre the Cultures i Cooperació Transfronterera

http://www.publicacions.udl.cat/

There will be a specific service for the *Campus Universitari d'Igualada*.

The use of other elements of protection (for example caps, masks, gloves of chemical or electrical risk, etc.) will depend on the type of practice to be done. In that case, the teacher will inform of the necessity of specific EPI.

Not bringing the EPI's described or not fulfilling the norms of general security that are detailed below imply that the student can not access to the laboratories or have to go out of them. The no realisation of the practices for this reason imply the **consequences in the evaluation** of the subject that are described in this course guide.

GENERAL NORMS OF SECURITY IN LABORATORY PRACTICES

- Keep the place of realisation of the practices clean and tidy. The table of work has to be free from backpacks, folders, coats...
- No short trousers or short skirts are allowed in the laboratory.
- Closed and covered footwear is compulsory in the laboratory.
- Long hair needs to be tied.
- Keep the laboratoy gown laced in order to be protected from spills of chemicals.
- Bangles, pendants or wide sleeves are not allowed as they can be trapped.
- Avoid the use of contact lenses, since the effect of the chemical products is much bigger if they enter between the contact lense and the cornea. Protection over-glasses can be purchased.
- No food or drink is allowed in the laboratory.
- It is forbidden to smoke in the laboratories.
- Wash your hands whenever you have contact with a chemical product and before going out of the laboratory.
- Follow the instructions of the teacher and of the laboratory technicians and ask for any doubt on security.

For further information, you can check the following document of the *Servei de Prevenció de Riscos Laborals de la UdL*: http://www.sprl.udl.cat/alumnes/index.html

Learning objectives

When finishing the subject the student must be able to:

- Consolidate a laboratory methodology initiated in chemistry and experimentation in chemistry subjects
- Apply to theoretical concepts developed in other subjects of the studies
- Know the use of the material and the devices that are in a chemical laboratory
- Know the handling of products and safety in the chemical laboratory
- Know how to perform in the chemical laboratory

- Work as a team performing a proper job distribution and solving thepossible conflicts thet arise during its execution

Competences

Basic

B01 That students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the vanguard of his/her field of study.

B02 That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

B03 That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.

B04 That students can transmit information, ideas, problems and solutions to a specialized and non-specialized public.

B05 That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

General competences

CG3. To synthesize basic and technological subjects, which enable them to learn new methods and theories, and provide them with versatility to adapt to new situations.

CG4. To sSolve problems with initiative, make decisions, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Chemical Engineering.

CG6. To implement specifications, regulations and mandatory rules.

CG7. To analyze and assess the social and environmental impact of technical solutions.

Specific competences

CE21. To design and manage applied experimentation procedures, especially for the determination of thermodynamic and transport properties, and modeling of phenomena and systems in the field of chemical engineering, systems with fluid flow, heat transfer, material transfer operations, kinetics of chemical reactions and reactors.

Transversal

CT5. To apply essential notions of scientific thinking.

Subject contents

- Optical methods of analysis
- Treatment and analysis of wastewater
- Fundamentals of engineering and unit operations

Methodology

- Attendance at practice sessions is compulsory as it involves hours of laboratory practices.
- The rest of the hours are of individual work, both for the preparation of the practices and for the subsequent realization of calculations, questions and the deduction of the conclusions.
- Practices will be carried out in small groups.
- After completing the practice in the laboratory, the questions and all the calculations, which are at the end of each procedure of the practice dossier, will be presented.
- At the end of the laboratory sessions, a random practice will be chosen for a report, this report will contribute to the student's final grade.
- Each student will have to bring a laboratory notebook where the data, calculations and questions will be written down, this book will also be valued to contribute to the final grade.
- Once the laboratory sessions have finished,The student will be taking an exam, which will contribute to the final grade of the subject.

Development plan

PraLab	Week 1	Week2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9

G1	Jar- test	Jar-test	Jar-test	Balance of matter	Balance of matter	Phosphates	Phosphates	Gravimetry Esterification	Gravimetry Esterification
G 2	Phosphates	Phosphates	Extraction solid -liquid	Jar-test	Jar-test	Jar-test	Balance of matter	Balance of matter	Gravimetry Esterification
G 3	Balance of matter	Balance of matter	Gravimetry Esterification	Gravimetry Esterification	Extraction solid-liquid	Jar-test	Jar-test	Jar-test	Water hardness
G 4	Gravimetry Esterification	Gravimetry Esterification	Balance of matter	Balance of matter	Water hardness	Extraction solid-liquid	Phosphates	Phosphates	Filter press

PraLab	Week 10	Week 11	Week 12	Week 13
G 1	Water hardness	Extraction solid-liquid	Filter press	Filter press
G 2	Gravimetry Esterification	Filter press	Filter press	Water hardness
G 3	Filter press	Filter press	Phosphates	Phosphates
G 4	Filter press	Jar-test	Jar-test	Jar-test

Evaluation

The final grade of the subject will be the sum of the following percentages:

- Questions - 25% of the average grade among all the questions presented.
- Practices report - 25% of the grade.
- Written exam - 25% of the grade.
- Lab book and laboratory work - 25% of the average mark between 50% laboratory and 50% book.

Bibliography

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Adaptations to the methodology due to COVID-19

- The assistance in the laboratory has been replaced by theoretical explanations through the videoconference tool and with the support of visual resources related to the different experimental techniques.
- The rest of the hours are of individual work, both for the preparation of the practices and for the subsequent realization of calculations, questions and the deduction of the conclusions, from the experimental data provided by the teachers.
- After completing the practice, the questions and all the calculations, which are at the end of each procedure of the practice dossier, will be presented.
- At the end of the sessions, a random practice will be chosen for a report, this report will contribute to the student's final grade.
- Each student will have to bring a laboratory notebook where the data, calculations and questions will be written down, this book will also be valued to contribute to the final grade.
- Once the sessions have finished,The student will be taking an online exam, which will contribute to the final grade of the subject.

Adaptations to the development plan due to COVID-19

The same course development plan is continued but in a non-classroom format in the laboratory.

Adaptations to the evaluation due to COVID-19

The final grade of the subject will be the sum of the following percentages:

- Questions - 35% of the average grade among all the questions presented.
- Practices report - 25% of the grade.
- Written exam - 25% of the grade.The exam format will be a written development test that must be submitted in pdf format.
- Lab book and laboratory work - 15% of the average mark between 50% laboratory and 50% book (corresponding to the part of the semester that was done in lab).