COURSE DATA

Data Subject	
Code	34210
Name	Chemistry Projects
Cycle	Grade
ECTS Credits	6.0
Academic year	2021 - 2022

Study (s)

Degree	Center	Acad. year	Period
1110 - Degree in Chemistry	Faculty of Chemistry	4	First term

Subject-matter

Degree	Subject-matter	Character
1110 - Degree in Chemistry	11 - Chemical Industry	Obligatory

Coordination

Name	Department
CERISUELO FERRIOLS, JOSEP PASQUAL	245 - Chemical Engineering

SUMMARY

Chemical Projects is a component of Chemical Company, the overall objective of which is to teach students how to design, develop and evaluate projects and reports in the field of Chemistry by applying their knowledge of methodology and the basic principles of economics, management, auditing and organisation. This compulsory 6 ECTS credit course is taught in the second semester of the fourth year of the Degree in Chemistry.

The objectives of the course are:

- to enable students to successfully manage any type of real project in the field of Chemical Sciences.

- to know the general theory of project management and justify this approach vis-a-vis a procedural management approach within an organisation in the chemical industry.

- to know the phases in the life cycle of a chemical project.

- to explain the characteristics needed for technical reports and other documents for presenting and defending projects, etc.

- to know the feasibility techniques for chemistry projects.

- to learn the techniques for the financial evaluation of chemistry projects.

- to learn the techniques for the planning and control of chemistry projects.

- to understand the relationship between the technical issues to be addressed in a project and an organization's strategic plan.

- to know the context of project management in chemistry from the perspective of risk and quality.

This course has a practical educational approach since it primarily focuses on developing students' practical engineering skills for application in their careers as project managers or as part of a team. By achieving these objectives, students will acquire numerous skills for managing material and human resources when planning and delivering any chemical project.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

Due to the general nature of this course, no specific prior knowledge is required. However, it is recommended that students will first have completed Computer Applications in Chemistry and Chemical Engineering to gain a perception of the more industrial aspects of Chemical Sciences.

OUTCOMES

1108 - Degree in Chemistry

- Demonstrate leadership and management skills, entrepreneurship, initiative, creativity, organization, planning, control, leadership, decision making and negotiation.
- Demonstrate ability to work in teams both in interdisciplinary teams and in an international context.

- Demonstrate ability to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences and using information technology, as appropriate.
- Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional.
- Demonstrate the ability to adapt to new situations.
- Recognise and analyse new problems and plan strategies to solve them.
- Relate chemistry with other disciplines.
- Prepare reports, surveys and industrial and environmental projects in the field of chemistry.
- Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.
- Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.
- Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.
- Express oneself correctly, both orally and in writing, in any of the official languages of the Valencian Community.

LEARNING OUTCOMES

The previous section includes the competences contained in the document VERIFICA. This subject addresses part of the learning results of the matter Projects in Chemistry that allow to acquire specific knowledge of chemistry, cognitive skills and general skills recommended by the EUROPEAN CHEMISTRY THEMATIC NETWORK (ECTN) for the Chemistry Eurobachelor® Label. The following table lists the learning outcomes acquired in the subject Projects in Chemistry related to the competences of the degree in Chemistry.

COMPETENCES AND COGNITIVE SKILLS	
The learning process should allow the degree graduates to demonstrate:	
	Competences of the subject Projects in Chemistry that contemplate the learning outcomes EUROBACHELOR®
Ability to demonstrate knowledge and understanding of the facts, concepts, principles and fundamental theories related to the topics mentioned above.	Demonstrate knowledge and understanding of essential facts, concepts, principles and theories related to the areas of chemistry..(CE13).

Ability to apply this knowledge and understanding to the solution of common qualitative and quantitative problems.	Solve qualitative and quantitative problems following previously developed models..(CE14). Recognise and analyse new problems and plan strategies to solve them..(CE15). Understand the qualitative and quantitative aspects of chemical problems..(CE24).
Competences for the evaluation, interpretation and synthesis of information and chemical data.	Evaluate, interpret and synthesise chemical data and information..(CE16). Interpret data from observations and measurements in the laboratory in terms of their significance and the theories that underpin them..(CE20).
Ability to recognize and implement science and the practice of measurement.	Show knowledge of the metrology of chemical processes including quality management..(CE10) Interpret data from observations and measurements in the laboratory in terms of their significance and the theories that underpin them..(CE20).
Ability to calculate and process data, related to information and chemistry data.	Solve qualitative and quantitative problems following previously developed models..(CE14). Recognise and analyse new problems and plan strategies to solve them..(CE15).

COMPETENCES AND COGNITIVE SKILLS RELATED TO THE PRACTICE OF CHEMISTRY	
The learning process should allow the degree graduates to demonstrate:	
	Competences of the subject Projects in Chemistry that contemplate the learning outcomes EUROBACHELOR®
Ability to perform risk assessments of the use of chemical substances and laboratory	Understand the qualitative and quantitative aspects of chemical problems..(CE24).

procedures.	Develop sustainable and environmentally friendly methods.(CE25). Evaluate the risks in the use of chemicals and laboratory procedures..(CE21).

GENERAL COMPETENCES	
The learning process should allow the degree graduates to demonstrate:	
	Competences of the subject Projects in Chemistry that contemplate the learning outcomes EUROBACHELOR®
Ability to apply practical knowledge to solve problems related to qualitative and quantitative information.	Solve problems effectively..(CG4). Solve qualitative and quantitative problems following previously developed models..(CE14). Relate theory and experimentation..(CE22). Recognise and evaluate chemical processes in daily life..(CE23). Understand the qualitative and quantitative aspects of chemical problems..(CE24).
Competences in information management, in relation to primary and secondary sources, including information retrieval through on-line searches.	Demonstrate ability to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences and using information technology, as appropriate..(CG6).

	Have basic skills in the use of information and communication technology and properly manage the information obtained.(CT2).
Ability to analyse materials and synthesize concepts.	Develop capacity for analysis, synthesis and critical thinking..(CG1). Show inductive and deductive reasoning ability..(CG2). Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration..(CB3).
Ability to adapt to new situations and make decisions.	Demonstrate the ability to adapt to new situations..(CG9). Recognise and analyse new problems and plan strategies to solve them..(CE15). Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration..(CB3).
Skills related to information technology such as word processing, spreadsheet, recording and storage of data, internet use related to the subjects.	Demonstrate ability to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences and using information technology, as appropriate..(CG6). Have basic skills in the use of information and communication

	technology and properly manage the information obtained.(CT2).
Planning and time management skills.	Develop capacity for analysis, synthesis and critical thinking. (CG1). Demonstrate leadership and management skills, entrepreneurship, initiative, creativity, organization, planning, control, leadership, decision making and negotiation..(CG3). Solve problems effectively..CG4).
Interpersonal skills to interact with other people and get involved in team work.	Demonstrate ability to work in teams both in interdisciplinary teams and in an international context..(CG5). Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional. (CG7). Demonstrate the ability to adapt to new situations..(CG9).
Competences in oral and written communication, in one of the main European languages, in addition to the language of the country of origin.	Demonstrate ability to work in teams both in interdisciplinary teams and in an international context..(CG5). Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional. (CG7). Express oneself correctly, both orally and in writing, in any of the official languages of the Valencian Community. (CT1). Students must be able to

	communicate information, ideas, problems and solutions to both expert and lay audiences..(CB4). Have basic skills in the use of information and communication technology and properly manage the information obtained.(CT2).
Study skills necessary for professional development. These will include the ability to work autonomously.	Demonstrate leadership and management skills, entrepreneurship, initiative, creativity, organization, planning, control, leadership, decision making and negotiation..(CG3). Demonstrate ability to work in teams both in interdisciplinary teams and in an international context..(CG5). Learn autonomously.(CG8). Demonstrate the ability to adapt to new situations..(CG9). Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.(CB5).
Ethical commitment to the European Code of Conduct: http://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf	Acquire a permanent sensitivity to quality, the environment, sustainable development and the prevention of occupational hazards.(CG10). Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional. (CG7). Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take

	relevant social, scientific or ethical issues into consideration. (CB3).

DESCRIPTION OF CONTENTS

1. Competencies and Professional Practice of the Graduate in Chemistry

1.1. Competencies of the graduate in Chemistry.
1.2. Professional practice of the graduate in Chemistry.
1.3. Quality management and risk management.

2. Introduction to Project Management

2.1. Introduction to the theory of projects
2.2. Phases of a project and areas of expertise; the life cycle of a Chemistry project
2.3. Managing the scope of a project
2.4. Time management
2.5. Cost management
2.6. Risk management
2.7. Managing resources

3. Financial Management of a Project

3.1. Definition and classification of costs.
3.2. Economic indicators for evaluating a project

4. Preparing and Documenting a Project

4.1. Introduction.
4.1.1. The importance of documentation
4.1.2. Classical document division
4.1.3. Criteria for managing documents
4.2. Structure of a classical project
4.2.1 Technical-Descriptive Report
4.2.2 Specification
4.2.3 Budget
4.2.4 Annexes
4.3. Documents in project management
4.3.1 Definition and description
4.3.2 Documents present in project planning
4.3.3 Documents for controlling and monitoring projects

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	41,00	100
Computer classroom practice	12,00	100
Tutorials	7,00	100
Development of group work	15,00	0
Development of individual work	10,00	0
Study and independent work	10,00	0
Readings supplementary material	5,00	0
Preparation of evaluation activities	15,00	0
Preparing lectures	10,00	0
Preparation of practical classes and problem	15,00	0
Resolution of case studies	10,00	0
TOTAL	**150,00**	

TEACHING METHODOLOGY

The development of the subject is structured around three axes: learning with the teacher (theory sessions, problems, and individual tutorials), computer laboratory sessions, and group tutoring sessions, where a project will be prepared completing all its stages: from the planning phase to the final drafting of the project document and its oral presentation.

Learning with the teacher

In the theory sessions the master class model will be used. The teacher will present the fundamental contents of the subject, using the audiovisual media available to them (presentations, transparencies, slate).

In the problem sessions the teacher will explain several standard problems.

Computer laboratory sessions

The laboratory sessions have as objective the learning and management of project management tools (MS Project).

Group tutoring sessions (elaboration of a project)

In group tutoring sessions, students who belong to the same tutoring subgroup will form teams in order to prepare a project that addresses content included in any of the areas of knowledge in the field of chemistry, completing all its stages: from the planning phase to the final drafting of the project document and its oral presentation.

EVALUATION

Continuous evaluation system

The knowledge acquired by the student in the subject will be evaluated through a continuous evaluation system, where the involvement and performance shown by the student in the following activities will be assessed:

a) Individual objective test of theoretical-practical nature: where the contents taught in the theory and problems master sessions will be evaluated (EX).

b) Group project: where the documentation generated for the project prepared in the group tutoring sessions will be evaluated, as well as its oral presentation (PR). This activity will be considered non-recoverable.

c) Case study of planning and monitoring a project: where the documentation generated for the case study prepared in the computer laboratory sessions will be evaluated (CS). This activity will be considered non-recoverable.

In the first call, it will be necessary to have achieved a minimum grade of 5 points out of 10 in each of the previous activities to pass the course, obtaining in this case the overall grade of the subject as the weighted average of the previous activities, according to the following equation:

Overall grade = 50 % EX + 30 % PR + 20 % CS

In case the previous requirement is not met, the overall grade of the subject in the first call will correspond to the lower of the grades achieved in the previous activities.

In the second call it will be necessary to have achieved a minimum grade of 5 points out of 10 in the individual objective test to obtain the overall grade of the subject as the weighted average of the previous activities.

In case the previous requirement is not met, the overall grade of the subject in the second call will correspond to that of the individual objective test.

General considerations

Apart from the aforementioned activities, the subject also includes the participation of students in a conference related to the subjects taught. This conference will be scheduled throughout the course during school hours, and attendance will be compulsory to pass the course.

In any case, the evaluation system will always be governed by the provisions established in the Evaluation and Qualification Regulations of the University of València for Undergraduate and Master Degrees (ACGUV 108/2017).

REFERENCES

Basic

- PROJECT MANAGEMENT INSTITUTE, A Guide to the Project Management Body of Knowledge, 4a edició,Project Management Institute (2008), ISBN: 19-33890517
- DOMINGO AJENJO, A., Dirección y Gestión de Proyectos, un enfoque práctico. Editorial Rama, (2005).ISBN: 9701511301.
- CABRA, L., DE LUCAS A., RUIZ, F. y RAMON M.J, Metodologías del diseño aplicado y gestión de proyectos para ingenieros químicos. Ediciones de la Universidad de Castilla La Mancha. 2010. ISBN:9788484277583
- GIMENEZ, A. Diseño de Procesos en Ingeniería Química. Editorial Reverte. 2003: 8429172777

Additional

- PEREÑA, J. Dirección y Gestión de Proyectos. Editorial Díaz de Santos (1991). ISBN: 8479782498
- GRASHINA M.N y NEWELL M.W, Preguntas y Respuestas Sobre La Gestión de Proyectos, Editorial Gestión 2000, (2005). ISBN: 9788480886864
- GOMEZ, J. F y CORONEL, A.J; MARTINEZ DE IRUJO y LORENTE, A. Gestión de proyectos. FC Editorial. Madrid, (2000). ISBN: 84-28317747.

ADDENDUM COVID-19

This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council

Contents

The contents initially indicated in the teaching guide are maintained.

Workload and temporary teaching planning

Regarding the workload:

The different activities described in the Teaching Guide are maintained with the intended dedication.

Regarding the temporary teaching planning:

The material to follow the theory/tutoring/classroom-seminar classes allows to continue the temporary teaching planning both in days and schedule, whether the teaching is face-to-face in the classroom or not, although in some of the activities the student has the freedom to follow the non-face-to-face sessions according to his own planning.

Teaching Methodology

Theory classes and classroom tutoring will tend to the maximum possible face-to-face teaching, always respecting the health restrictions that limit the capacity of the classrooms to 50 % of their usual occupation. Depending on the capacity of the classroom and the number of students enrolled, some of the students may need to follow the classes synchronously in an auxiliary classroom. If this situation arises, students will attend the main classroom or auxiliary classroom for weekly rotary shifts (preferably in alphabetical order). However, the rotation system will be fixed once the actual enrollment data is known, guaranteeing, in any case, that the percentage of face-to-face teaching of all students enrolled in the subject is the same.

The occupation of computer classrooms will be 50 % compared to the usual occupation. If the number of students enrolled exceeds the capacity of 50 % of the classroom, students will attend the face-to-face course in weekly rotating shifts (preferably in alphabetical order). However, the rotation system will be fixed once the actual enrollment data is known, guaranteeing, in any case, that the percentage of face-to-face teaching of all students enrolled in the subject is the same.

The methodology used for non-face-to-face classes shall be:

1. Asynchronously using presentations with audio narration or other virtual classroom tools

2. Resolution of exercises and questionnaires

If there is a closure of the facilities for health reasons that totally or partially affects the classes of the course, they will be replaced by non-face-to-face sessions following the established schedules and using the tools of the virtual classroom.

Evaluation

The evaluation system described in the Teaching Guide of the subject in which the various evaluable activities have been specified as well as their contribution to the final grade of the subject is maintained.

If there is a closure of the facilities for health reasons affecting the development of any face-to-face evaluable activity of the subject, it will be replaced by a test of a similar nature that will be carried out in virtual mode using the computer tools licensed by the University of Valencia. The contribution of each evaluable activity to the final grade of the subject will remain unchanged, as set out in this guide.

References

The literature recommended in the Teaching Guide is maintained since it is mostly accessible, and it is complemented by notes, slides and problems uploaded to the Virtual Classroom as material of the course.