COURSE DATA

Data Subject	
Code	34210
Name	Chemistry projects
Cycle	Grade
ECTS Credits	6.0
Academic year	2016 - 2017

Study (s)

Degree	Center	Acad. year	Period
1108 - Degree in Chemistry	Faculty of Chemistry	4	Second term

Subject-matter

Degree	Subject-matter	Character
1108 - Degree in Chemistry	11 - Chemical company	Obligatory

Coordination

Name	Department
GIMENEZ ROMERO, DAVID	315 - Physical Chemistry

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.

COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

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 be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.
- 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 (RD 1393/2007) // NO CONTENT (RD 822/2021)

The learning outcomes of Projects in Chemistry are as follows:

- to understand the basic principles of Management and Project Management in the field of Chemistry and to use these principles to create, analyse and select plausible alternatives for solving problems in their field.

- to select the most suitable tools for achieving the main objectives of quality, cost and conditions in project management.

- to know the various types of Chemistry projects.

- to know the various entities that intervene during the life cycle of a project.

- to know the feasibility analysis techniques.

- to document a project from both the technical and management perspectives.

- to understand the organizational structure of a company.

- to learn the techniques for planning and controlling projects.

- to write and develop projects in the field of Chemistry.

- to know how a company is professionally organised and what the basic paperwork requirements are; to know the current legislation especially regarding privacy and the security of information.

- to work in teams in one's discipline or from a multidisciplinary approach.

- to manage information and use Information and Communications Technology (ICT) in Project Management.

- to gain organizational and planning skills particularly in the field of business; to have applied knowledge of business organization.

- to have critical thinking skills, creativity and decision-making ability.

- to collect and interpret information and make judgments on social, scientific, technological or ethical issues.

- to know the standard methods, tools and disciplines for managing and administrating Chemistry projects.

- to have the skills needed to continue learning and training throughout one's career with a high degree of autonomy.

- to implement aspects related to quality and risk in the development of a Chemistry project.

In addition to the above specific objectives, the course will develop several generic skills, including: the analysis and synthesis of Chemistry-related problems, how to use rational and logical criteria to make an argument, how to communicate correctly and in an organised fashion, how to deal with problems systematically, individual work, timing and teamwork.

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: static models
3.2.1. Cost capacity
3.2.2. Diagram of the equilibrium point
3.2.3. Studies based on ratios
3.3. Economic indicators for evaluating a project: dynamic models
3.3.1. Cash Flow (Cash flow)
3.3.2. Net Present Value (NPV)
3.3.3. Internal Rate of Return (IRR)
3.3.4. Accounting Rate of Return
3.3.5. Recovery period (payback)
3.3.6. Benefit-cost ratio

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 course is structured around four axes: learning with the lecturer (theory sessions, problem-solving sessions and tutorials), seminars/workshops, laboratory sessions, and a project incorporating all the stages of a project, from the initial planning to the final completion of the project document.

Group learning with the lecturer

In the theory sessions the lecturer will use audiovisual means (presentations, transparencies and blackboard) to present the basic course contents.

In the problem-solving sessions, the lecturer will explain a number of typical problems corresponding to topics 2 and 3. Students will learn to implement planning studies (topic 2), economic viability studies and operating accounts (topic 3) and construct the timetable for implementing a project. These participatory sessions are intended to encourage communication between the students and the lecturer. To enable student to prepare in advance for these sessions, the lecturer will inform students in advance which day will be set aside for solving problems and what problems these will be. The problems will be solved in groups of four or five students. Once the problems have been solved, students will be asked to come to the blackboard to explain the problem and answer any questions arising from the other groups.

Seminars/workshops

The theoretical concepts discussed in the lectures will be complemented by a series of seminars/workshops to address specific project management issues in Chemistry, such as the need for quality and risk management. In small groups of 2-4, the students will apply further information provided by the lecturer to solve practical cases. These solutions will then be discussed by the lecturer and the other students. Both the proposed solutions to the problem and the interventions by the other students will be taken into account for the final course evaluation.

Additionally, the teacher will teach a seminar about the master thesis and the training practices (curricular and extra-curricular) in Chemistry. Attendance at this seminar is compulsory and students must make a summary of the above. The summary you will be used in the final grade for the course.

Laboratory sessions

The aim of the laboratory sessions is to acquire competence in:

- using commercial (Microsoft Project) and free (GanttProj) project management tools;

- creating Microsoft EXCEL-type spreadsheets to represent the scope of a project (WBS/WBS) and study its exploitation and economic viability;

- quality and risk management practices.

These laboratory sessions will be conducted individually or in pairs.

Completion of a group project

The same groups of 2-4 students as those involved in the seminars/workshops will prepare a project on any area of Chemistry. All stages of the project must be covered, from the planning stage to the completion of the final project document and the project presentation. The project will be planned using MS Project or a similar program used in the laboratory sessions. Also required are a description of the scope of the project (WBS/WBS) and a financial study based on EXCEL or a similar spreadsheet.

Also, following the classical system for the development of the project's life cycle, each team must prepare project documentation divided into the usual four sections: description of the project, specifications, budgets and a basic block diagram for the proposal.

Each team must submit a copy of their project before the end of the semester. On the final day of the course, those projects that in the opinion of the lecturers are of special quality will be presented and defended in public.

Tutorials

Students will be provided a schedule for their tutorials at the beginning of the academic year. The aim of these tutorials is to solve any problems, answer any questions, and guide students in the production of their written papers, etc. Students will also be able to ask questions via email or in the discussion forums using the Virtual Classroom provided by the University of Valencia.

EVALUATION

Students will be evaluated by:

1) Continuous assessment (first call)

2) Single assessment (second call)

Continuous Assessment

This is the method recommended to students for their course evaluation. This system of regular evaluation will involve the students in both their learning activities and the learning process. This system of evaluation is compulsory for the first call.

The following activities will be evaluated:

Theory sessions: student participation in the theory sessions will be evaluated by taking into account their regular attendance, the submission of their assignments and their level of participation on them.

Practice sessions/project: student participation in the practice sessions/project will be evaluated by taking into account their level of involvement and their performance in the completion of their project. Also taken into account will be their attendance at regular classroom activities, seminars and tutorials, their submission of assignments, their participation in the classroom problem-solving activities, and their active participation in general (NP).

Computer Room Practice Sessions: student participation in the computer room practice sessions will be evaluated by taking into account their attendance at these activities and their submission of the exercises (NL).

Single objective examination: this will comprise a comprehensive review of the subject, or a knowledge test, involving both theoretical and practical topics and problem-solving activities (NEX).

For this type of evaluation to be implemented, students must have attended over 75% of their laboratory sessions.

Only assignments submitted by the deadline set by the lecturer will be accepted. These assignments include classroom exercises (theory and practice), the group project and the laboratory exercises.

To be able to apply the average of the scores for the various categories, students must obtain a score of at least 5 (out of 10) in each category.

If students satisfy all the criteria with regard to the time constraints, attendance and minimum scores, the final grade for this evaluation system will be calculated as follows:

Final grade = 50%NEX+25%NP+25%NL

Single Assessment System

The Single Assessment System will apply to the second call. The score for this second call is derived from 70% of the grade obtained in a single comprehensive review of the subject and 30% of the grade obtained for the group project that was due to be completed during the course and was evaluated in the first call. This comprehensive review will coincide with the final theoretical exam (in the first call) for those students who have followed the continuous assessment.

This single comprehensive review will cover the contents of the theory sessions, practical sessions, and computer laboratory sessions.

For the Single Assessment System of evaluation, students must obtain at least 5 points (out of 10) on the comprehensive review. Any student who has been found to copy or plagiarise any assessment activity or who has not complied with the established rules will be awarded a final "Fail" grade and the academic authorities will be notified in order to begin the appropriate punitive measures.

The final evaluations of each student will comply with the Regulations of Grades of the University of Valencia. At the time this course guide was written, the regulations in force are those passed by the Governing Council of the University of Valencia on January 27, 2004. These regulations, which satisfy the provisions of Royal Decrees 1044/2003 and 1125/2003, state that final grades will be expressed numerically to one decimal place on a scale of 0 to 10 and will be accompanied by the appropriate descriptor as follows:

From 0 to 4.9 "Not passed"

From 5 to 6.9 "Passed"

From 7 to 8.9 "Good"

From 9-10: "Excellent " or "Excellent with Distinction"

REFERENCES

Basic

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- 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

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- 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.