

COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 1 of 7

GENERAL FEATURES *

Type: Basic Training Compulsory Elective

Master's thesis work, Practicum

Duration: Semester

Semester / s: 3

Number of ECTS credits: 30

Language / s: Spanish, Catalan, English

DESCRIPTION

BRIEF DESCRIPTION AND JUSTIFICATION (The meaning of the course in relation to the program. Between 100 and 200 words.)

The Master's Thesis (TFM) is a research project or individual engineering project in an IQS research group.

The topic of the TFM should be adapted to the objectives and competences of the Master. The offer of the topics the TFM will be made before the start of the semester in which the TFM is developed. Based on this offer, the students will contact the corresponding professor to agree on the completion of the TFM.

With the same academic guarantees, and always under the direction of an IQS Professor, the TFM may be carried out in other institutions, like other national or foreign universities, public or private research centers, or chemical companies. In all these cases, an institutional agreement has been signed.

The work will lead to a written report and a presentation in front of an evaluation committee. The TFM is carried out for 6 months in the third semester of the Master.

COMPETENCES (Of course you put in relation to the skills pre-assigned in the field.)

Basic competences

CB6 - Have and understand knowledge which provides the ground or opportunity to be innovative in the development and/or application of ideas, often in a research context

CB7 - Apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study

CB8 - Integrate knowledge and deal with the complexity of formulating judgments based on information which, being incomplete or limited, includes reflections on social and ethical responsibilities related to the application of their knowledge and judgments

* These features should not be modified without the approval of the bodies responsible for academic higher-level structures (field, module and / or system).

COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 2 of 7

CB9 - Communicate conclusions, and the reasons that sustain them, to specialized and non-specialized audiences in a clear and unambiguous way.

CB10 - Understand the need for life-long learning in a self-directed or autonomous way.

General competences

CG1 - Ability to lead, direct and manage projects in academic or business environments adapting to the structures, needs and ways of operation of each institution

CG2 - Ability to perform a responsible practice of the profession

Specific competences

E21 - Ability to plan, implement, manage and present a research project in the Analytical Chemistry field

E22 - Ability to develop activities of fundamental and applied research and of innovation in academic and industrial environments integrating projects and interdisciplinary activities

E23 - Ability to apply and integrate advanced knowledge of the Analytical Chemistry disciplines in the realization of a project of fundamental or applied research

E24 - Ability to apply advanced chemical methodologies and tools for research, development and production of products and services in the Analytical Chemistry field

E25 - Ability to design, perform and interpret experiments in the Analytical Chemistry field

E26 - Ability to obtain original results susceptible of being published

Transversal competences

T1 - Ability to communicate in English and use English as a working language

T2 - Ability to lead and direct teams

T3 - Ability to assess the impact of the use of chemistry in the sustainable development of the society

COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 3 of 7

PREREQUISITES * (Modules, materials, disciplines or expertise needed to track the subject. Contain subjects that must have been completed can be made.)

To start the TFM, the student must have passed 50 ECTS of the 60 ECTS corresponding to the first and second semester Modules.

TFM may be carried out in IQS, in other institutions, like other national or foreign universities, public or private research centers, or companies. It can be also carried out in a mobility type ERASMUS Study in universities with TFM of 30 ECTS or higher.

When the TFM is carried out in a foreign institution, the student must demonstrate that he or she has the language proficiency required by the host institution.

CONTENTS (Sections that make up the syllabus, to a second level of detail.)

During the period of completion of the TFM, the student is integrated into the discipline and regulations of the research group (or department) of IQS or of the research group (or administrative unit) external to IQS (university, research center or company) under the responsibility of the Director (or directors) of the TFM to which he must report the results obtained and consult the difficulties encountered as well as participate in monitoring meetings of the research group, seminars, etc.

Once the experimental part of the TFM is completed and in agreement with the Director (or directors), the student will initiate the preparation of the memory required for the TFM presentation and defense.

For the presentation and defense of the TFM, the student must have passed the total of ECTS corresponding to the other modules of the Master.

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COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 4 of 7

METHODOLOGY

TRAINING ACTIVITIES * (Complete the table relating activities, workload in ECTS credits, and skills.)

Training Activities	ECTS	Competences
Experimental or field work	21	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
Presentations	0,4	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
Activities of personal study by students	8,5	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
Evaluation activities (exams, monitoring controls ...)	0,1	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
TOTAL	30	

TEACHING METHODOLOGY (Justifying the teaching methods used in relation to the competences and contents of the course. Between 100 and 200 words.)

Practical work / laboratory: Performing laboratory activities or similar (practices with computer, projects, workshops, etc.) by the student, under the direct supervision of a professor.

Presentations: Oral presentation to a professor and possibly other students by a student. It can be a paper prepared by the student by searching the published literature or a summary of a practical or project undertaken by the student.

Activities of personal study by students: Personal work required of the student to acquire the competences of each subject and assimilate the knowledge presented in the sessions of exposition of concepts and of solving exercises, problems and cases, using, when necessary, the consultation recommended material.

Evaluation activities: Oral and/or written statements made during a semester or after it.

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COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 5 of 7

EVALUATION

ASSESSMENT SYSTEM * (Complete the table relating evaluation methods, competences and weight in the course grade.)

The director of the TFM will deliver, prior to the presentation and defense of the TFM, a report on the student. The report will contain information regarding:

- 1) The qualification of the experimental or field work (50% final grade)
- 2) The evaluation of competences.
- 3) Observations, including comments on the student's performance and behavior.

Evaluation Methods	%	Competences
Defense	30%	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
Projects and presentations	20%	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10
Experimental or field work	50%	E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2, CB6, CB7, CB8, CB9, CB10

LEARNING OUTCOMES (Explanation of the embodiments that allow the student skills assessment, relating them to the skills and methods of assessment.)

- The student must demonstrate the ability to lead a research project. (E21, E22, T1, T2, T3, CG1, CG2)
- The student must demonstrate that he knows how to propose and develop a research project, with the application and integration of advanced knowledge of Analytical Chemistry, the use of advanced methodologies and tools and obtaining original results. (E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2)
- The student must demonstrate their ability to work as a team. (E21, E22, T1, T2, T3, CG1, CG2)
- The student must demonstrate learning skills to achieve the objectives of a project. (E21, E22, E23, E24, E25, E26, T1, T2, T3, CG1, CG2)

QUALIFICATION (Explanation of the computer system of the course grade.)

The grade of this course is obtained:

Experimental or field work	50%
Defense	30%
Projects and presentations	20%

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COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 6 of 7

ASSESSMENT OF THE COMPETENCES (Define calculation expressions for each competence and the relevant evaluation methods.)

Competences	Grade (0 to 10)	Comments
Apply their knowledge and their ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study (CB7). Ability to apply advanced chemical methodologies and tools for research, development and production of products and services in the Analytical Chemistry field (E24). Ability to design, perform and interpret experiments in the Analytical Chemistry field (E25).		Qualified by the TFM director EXPERIMENTAL OR FIELD WORK (50% of the grade)
Ability to perform a responsible practice of the profession (CG2). Ability to assess the impact of the use of chemistry in the sustainable development of the society (T3).		Evaluated by the TFM director
Understand the need for life-long learning in a self-directed or autonomous way (CB10).		Evaluated by the TFM director
Ability to communicate in English and use English as a working language (T1).		Evaluated by the TFM director
Ability to lead and direct teams (T2).		Evaluated by the TFM director
Ability to obtain original results susceptible of being published (E26).		Evaluated by the TFM director
Have and understand knowledge which provides the ground or opportunity to be innovative in the development and/or application of ideas, often in a research context (CB6). Ability to apply and integrate advanced knowledge of the Analytical Chemistry disciplines in the realization of a project of fundamental or applied research (E23).		Qualified by the Evaluation Committee PROJECTS AND PRESENTATIONS (20% of the grade)
Integrate knowledge and deal with the complexity of formulating judgments based on information which, being incomplete or limited, includes reflections on social and ethical responsibilities related to the application of their knowledge and judgments (CB8). Communicate conclusions, and the reasons that sustain them, to specialized and non-specialized audiences in a clear and unambiguous way (CB9).		Qualified by the Evaluation Committee DEFENSE (30% of the grade)
Ability to lead, direct and manage projects in academic or business environments adapting to the structures, needs and ways of operation of each institution (CG1). Ability to plan, implement, manage and present a research project in the Analytical Chemistry field (E21). Ability to develop activities of fundamental and applied research and of innovation in academic and industrial environments integrating projects and interdisciplinary activities (E22).		Qualified by the Evaluation Committee FINAL GRADE (Sigma)

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COURSE: MASTER'S THESIS

SUBJECT: Master's Thesis

MODULE: Master's Thesis

PROGRAM: University Master's Degree in Analytical Chemistry

Page 7 of 7

BIBLIOGRAPHY (Recommended and accessible to students.)

Each Master's Thesis will have its own specific bibliography.

DOCUMENT HISTORY

PREVIOUS CHANGES (You set the date and author / s, the most recent first)

October 2015. Dr. Jordi Abellà Iglesias

LAST REVISION (Indicate date and author / s.)

September 2016. Dr. Jordi Abellà Iglesias