Università di Camerino

Scuola di Scienze e Tecnologie

Laurea in Chemistry and Advanced Chemical Methodologies
(Master Degree in Chemistry and Advanced Chemical Methodologies)

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Number of credits: 120 ECTS.

Degree Programme introduced from the Academic Year 2011-2012.

Entry qualifications for this Degree Programme: First cycle degree in Chemistry The University of Camerino has been awarded with the Eurobachelor label (Certificate Number SCI-EB10-05 awarded in December 2010)

Self-evaluation report for application of the Euromaster Label in Chemistry

This report is written according to the guidelines outlined in the Chemistry Euromaster documents and follows the suggested structure.

I. Judging the quality of Euromaster programmes: "Fitness for Purpose"

I.1. Outcomes: Subject Knowledge

The Master program ensures that students, according to the Budapest descriptors for a second cycle degree in Chemistry, have shown themselves by appropriate assessment to:

a) Have knowledge and understanding that is founded upon and extends that of the Bachelor's level in Chemistry and that provides a basis for originality in developing and applying ideas within a research context;
b) Have competences which fit them for employment as professional chemists in chemical and related industries or in public service;
c) Have attained a standard of knowledge and competence which will give them access to third cycle course units or PhD programmes.

Such graduates will:

- Have ability to apply their knowledge ad understanding, and problem solving abilities, in new or unfamiliar environments within broader (or multidisciplinary) context related to chemical sciences;
- Have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on ethical responsibilities linked to the application of their knowledge and judgements;
- Have the ability to communicate their conclusions and the knowledge and rationale underpinning these, to specialist and non-specialist audience and unambiguously;
- Have developed those learning skills that allow them to continue to study in a manner that may be largely self-directed or autonomous, and to take responsibility for their own professional development.

I.2. Outcomes: Abilities and Skills

The master degree in Chemistry and Advanced Chemical Methodologies will prepare a professional able to work in labs, industries and public corporations at a manager level, in the following fields:

- innovation in the synthesis of old and new products in keeping with efficiency and environmental sustainability required by European laws nowadays in force;
- use of advanced technologies for the structural determination of new molecules;
- identification and use of suitable technologies for industrial analyses, quality of products and process control, in clinical, toxicological, forensic and environmental fields;
- use of computational techniques devoted to structural and mechanistic problem solving, to statistical treatment of data and process optimization.

II. Study Programme structure

This master degree course is organized into one curriculum that allow to acquire skills and professionalisms in the following fields:

- design and perform efficient and eco-friendly syntheses of organic, inorganic and organometallic molecules, among them also fine chemicals for pharmaceutical, agricultural, food, biotechnological fields and new functional materials. Particular attention will be focused on catalysis, economic efficiency and sustainable technologies. Bioorganic and bioinorganic studies will provide the correct theoretical/mechanistic bases for the comprehension of the action mechanism of biologically active molecules, among them natural organic substances and products for agriculture, food, and health.
- evaluate the proper technique to solve a practical problem occurring during scientific research, industrial and applied research, quality assurance in tertiary and industrial sectors, environmental, clinical, agro-food and forensic activities. The student will develop skills in most modern instrumental techniques and abilities in critical evaluation of quality parameters related to the peculiar problem. Complex matrixes (industrial, alimentary, biological and environmental) will be treated with the more advanced techniques. The student will be able to use software for data base management and data elaboration.

All the activities connected with experimental thesis will play a significant role since the student will be involved in an advanced research project developed with an increasing autonomy. The thesis will be focused on experimental lab activities in order to warrant an adequate formation into the scientific research, to develop skills in independent experimental work, in data acquisition and elaboration, in discussion and critical presentation of results and of international chemical literature.
Table 1 (reported in Appendix 1) provides an outline of the structure of the study programme divided according to years 1-2 (corresponding to 120-credit programmes).

The total number of the 120 credits is distributed according to the following Scheme:

Disciplines	**C**	**E**	**T**
Inorganic Chemistry	18	5	30
Organic Chemistry	18	10	30
Analytical and Environmental Chemistry	28	15	30
Physical Chemistry	6	0	30

C = Compulsory, **E** = Elective, **T** = Thesis

III. Language

All the training activities are held in English language.
The University of Camerino is distinguished in the national panorama for the number and quality of agreements with foreign Institutes and Universities. Among them, there is the possibility for postgraduate students to get a Double Degree in Chemistry thanks to the agreement with the Instituto Superior Tecnico (IST) of Lisbon. The Programme, developed and organised jointly by the institutions, leads to two recognised Master's degree certificates, one from the student's home institution and one from the host institution. The program requires that students spend at least one semester at the host University. UNICAM and IST accept to transfer semester credits obtained by a student to the other institution to be taken into account towards the degree awarded by the home institution subject to their internal rules and regulations. Students are granted mobility

scholarships yearly by UNICAM in order to stay at the foreign university for requested periods.

IV. ECTS and Student Workload

IV.1 Two annual semesters of *ca* 15 weeks, with a total of *ca* 30 weeks per year, as teaching activities (lessons and laboratories), are provided. A total of 14 weeks are reserved for examinations; in detail, winter session of 4 weeks at the end of the 1st semester, a summer session of 6 weeks after the 2nd semester, and an additional session of 4 weeks after the summer break. Thus the average academic year will be *ca* 44 weeks.

IV.2 The Ministry of Education expects that the students work annually 1500 hours, corresponding to 40-42 hours on academic study per week.

IV.3 For each credit unit, the student workload is estimated as follows:

lecturing:	1 credit unit corresponds to 7 hours lecturing.
tutorials/problem-solving classes:	1 credit unit corresponds to 12 hours tutorials/ problem-solving classes (depending on the activity requirements/bonus for the final examination).
laboratory courses:	1 credit unit corresponds to 12 hours laboratory work.

IV.4 During the course the students will fill a questionnaire covering various topics, including the workload of the course compared to the credit units The questionnaires will be collected anonymously and the summary made by a clerk is given to the lecturer and to the head of the Faculty. The other feedback mechanism is based on tutor group sessions in which the problems encountered by the students are faced. The results are used to improve the structure of programmes if necessary.

V. Modules/Course Units and Mobility

V.1 Mobility is possible in both the 1st and 2nd years.

VI. Methods of Teaching and Learning

VI.1 Institutionally a professor as tutor is assigned to every student for his study program. In addition, each professor has a defined time scheduled for receiving the students individually, to help them in each step of their studies , such as subjects discussed in the lectures, information on the program of the course, andthe preparation of examins. Tutorial activities based on selected PhD students is offered , with the aim to provide training and practice in solving problems, both individually and in groups, to provide feedback to students on their understanding of lecture course material and problem-solving skills, and to develop students' communication skills.

VI.2 Teaching to small groups (2-3 students) is the predominant didactical methodology adopted in the practical courses. In theoretical courses normally there isn't any special activity to be performed in small groups.

VI.3 In some lecture courses problem-solving class tests are scheduled. In some cases these tests are needed to participate in the final examination of the course.

VI.4 Multimedia techniques are often used in our courses. All the lecture halls are equipped with multimedia facilities and special facilities are available in the departments.

VI.5 Master Thesis is based on an experimental work carried out by the students and it is verified through the final dissertation. The Master Thesis can be based in a practical training in the industry. For such activity a system of cooperation must be agreed between university and industry, with a tutor from each partner.

VI.7 The student can perform his Master thesis period, that corresponds to 30 credits of applied research and 10 credits devoted to preparation of his/her chemistry project, in Industries.

VI.8 The students have a representation in the Senate of the Representatives (6 students), in the Administration Council (1 student), in the Committee of Equal Opportunities (4 students) and in the Committee for University Sports (3 students).

VII. Assessment procedures and performance criteria

VII.1 Usually the assessment is carried out with examinations at the end of each period or semester, during specific sections assigned to the examinations. There are three official sections devoted to this activity: one just at the end of the semester, one summer section and one fall section. However, in many cases, special sections can be arranged, according to the demand of the students.

VII.2 We have no "comprehensive examinations".

VII.3 Both written and oral examinations are generally used. In some courses, preliminary laboratory reports are followed by oral discussion. In any case, oral examinations are predominant.

VII.4 Usually marking is not checked by a second examiner separatedly.

VII.5 In all examinations at least 2 examiners are always involved.

VII.6 Maximum time for written examinations is 4 h and the minimum 2 h.

VII.7 Generally there is a public list with names of the students and the results obtained in the examination.

VII.8 Normally there is not any feedback for students in the form of "model answers" except in few courses, since most of the examinations are oral and the corrections are done in real time. In the case of written examinations and scientific reports, some teachers discuss with the students their own examination or reports.

VII.9 We have no examination board approving written examinations. It is the responsibility of the teacher(s) concerned.

VIII. Grading

VIII.1 For individual courses the ECTS grades of 18 – 30 are assigned by the lecturer. For modular courses the ECTS grades of 18 - 30 are assigned by all the lecturers involved. In all cases the grades are registered and collected by the Students Registry Office. The Master grade (from 66 to 110) is assigned by the School of Science and Technology.

IX. The Diploma Supplement

IX.1 The Diploma Supplement describing all study attainments is given by the Office of the University after the discussion of the Master Thesis. The Diploma Supplement form is stated by the Italian Ministry of Education .

IX.2 The languages of the Diploma Supplement are English and Italian.

X. Quality Assurance

The Chemistry Euromaster® designation is a quality label and involves the formation of one of the first trans-national European quality assurance networks in the emerging European Higher Education Area.
Quality assurance (or quality enhancement) is also an internal matter, and thus the applicant is asked to describe briefly the internal quality assurance procedures of the faculty/department and (if these have a direct impact on the faculty/department) of the institution.
The Quality Assurance System at the University of Camerino is based on a series of procedures that regulate the main steps of the learning process. Most of the Bachelor programs are involved in the QA and have been awarded with the ISO9001:2008 quality label by AFAQ (AFNOR group, France). Between them, the Bachelor degree in chemistry is involved in the quality label since 2003. The Master degree course in Chemistry has been using the same procedures for a few years and is now under examination to be included in the internal quality assurance structure, with the aim the obtain the ISO9001:2008 label in 2012.
The structure of the quality assurance system has a direct impact on all the phases of the Master degree (students enrollment, courses organization, courses delivering, communication, tutoring, stage and placement, mobility, resources, analysis and enhancement, etc.). Once a year the correct application of procedures is verified by an internal audit group and by the external visit by AFAQ. There is also a capillary customer satisfaction analysis based on students, families and employers interviews, which, together with the National and International indicators, leads the quality enhancement process.

XI. Employability

Postgraduates in Chemistry and Advanced Chemical Methodologies of the University of Camerino will possess adequate knowledge and skills to easily find a job in chemical industries, manufacturing sector and analysis/control laboratories. The postgraduates will apply in research, management and control activities, validation of new analytical methods, handling and management of advanced scientific instruments, organization and management of productive processes. They will also be able to plan and synthesize new molecules and new materials.

Statement of Applicant

I, Professor Silvia Zamponi, Responsible of the Degree Courses in Chemistry of the School of Science and Technology of the University of Camerino, Italy, hereby agree that this School will, if awarded the Euromasterr label, recognize Master degrees in Chemistry awarded by other institutions holding the Euromaster label as providing automatic right of access (but not of admission) to Chemistry Master programs offered by this School.

Appendix

1) Outline of the study programme.
2) Resources available for the programme
3) Module/course unit descriptions.
4) Names and curriculum of the academic staff involved in delivering the degree programme.
5) Official regulation of Camerino University and Italian Ministery on activation of Master degree in Chemistry and Advanced Chemical Methodologies.
6) Diploma supplement