



European Master in Quality in Analytical Laboratories



Annual Report of the Examiners' Board - Part I

University of Barcelona

July 3, 2013

Summary	3
What is EMQAL?	4
1. Introduction	4
2. Structure	5
3. Modules	6
4. Policy and Management of EMQAL	7
Overview of EMQAL 2008-2013	9
1. Candidates and Students	9
2. Number of Modules	13
Distribution by discipline	13
Contribution by partner Universities	14
3. Distribution of Research Theses	15
4. Student's Performance	16
Curricular Year	16
Research Thesis	17
Student initiatives	18
5. Alumni Information	19
Current Academic Year: 2012/2013	22
1. Quality Assessment	22
Annual Questionnaires	22
Improvements relative to previous editions	27
Follow up of corrective actions from previous editions	29

Summary

This report summarizes the results of the EMQAL project to be presented to the Programme Committee. The Programme Committee is the highest management structure in the organization of the EMQAL project. It includes representatives of the partner Universities, of the students, the lecturers, the research supervisors, and representatives of the chemical industry and regulatory bodies, as course external stakeholders.

The annual report for the Programme Committee typically provides a brief description of the project, of its results in the previous editions and of the plans for following editions. It is intended to be the basis for the discussion and approval by the PCm of the list of modules and research topics for the next edition of the course.

The report is made of two parts: Part I is dedicated to the first five editions of the EMQAL project, 2008-2013. Part 2 focuses on the next and future editions of the new EMQAL, 2013-2018.

What is EMQAL?

1. Introduction

EMQAL is a master course for laboratory managers and scientists who wish to implement and manage Quality Systems in analytical laboratories, or work in Quality System environments in accredited analytical laboratories.

The master was created and developed between 2004 and 2007 by the consortium of universities:

University of Algarve (UAlg, Portugal, PT)
University of Barcelona (UB, Spain, ES)
University of Bergen (UiB, Norway, NO)
University of Cadiz (UCA, Spain, ES)
Gdansk University of Technology (GUT, Poland, PL)

In 2008, the Programme Committee has decided to expand the consortium to universities from the four emerging economies: Brazil, Russia, India, and China. In 2009, Central South University (CSU, China), became the first non-European partner of the Consortium. The University of São Paulo (USP, Brazil) and Novosibirsk State University (NSU, Russia) joined the project in 2013.

The course was selected by the European Commission for funding under the Erasmus Mundus Programme in 2008 - 2013, in a project coordinated by the UAlg. In 2012 it was restructured and reselected for an additional 5 editions of funding under the Erasmus Mundus Programme, 2013-2018, coordinated by UB.

In its first five editions, the course duration was 18 month (90 ECTS), consisting of a 1 year (60 ECTS) taught course and a 6 months Project and Thesis (30 ECTS). From 2013 onwards it will be expanded to 24 months (120 ECTS) with one year of classes and one year of research thesis.

The main language of instruction is English. Each university also offers an intensive language school during the summer prior to the programme, as well as local language training during the course.

In the first year, classes take place in the Host Institution, and are lectured by specialists from all the partner institutions. The Host Institutions have been:

Academic Year	Host
2008/2009	UAlg
2009/2010	GUT
2010/2011	UB
2011/2012	UAlg
2012/2013	UCA

In the next edition of EMQAL, 2013/2014, the Host will be the UB.

The final Qualification obtained is a **European Joint Master Degree** in Quality in Analytical Laboratories which is awarded by the European universities that the student visited as part of the ERASMUS MUNDUS programme. Details of the modules and research projects that were followed by the students are given in a Diploma Supplement.

More information can be found at the EMQAL website: www.emqal.org.

2. Structure

The course is organized in three main disciplines that are crucial for a successful laboratory manager:

Quality Management (QM) - 10 ECTS

Analytical Methods (AM) - 10 ECTS

Data Analysis (DA) - 10 ECTS

And an optional discipline of 30 ECTS.

Each discipline is made up of “stand alone” modules .

Modules are typically worth 2 ECTS each, last one week, and are lectured by a specialist in the field.

Students must choose 5 optional modules within each main discipline, to fulfill a total of 10 ECTS, and 15 additional modules to fulfill the optional discipline.

Each module has 2 ECTS credits. According to the definition of ECTS credits, the student workload of one year of study corresponds to 60 ECTS credits, so a student should take 30 EMQAL modules during one year. Each student must take at least 5 modules from each one of the three disciplines - Quality Management, Analytical Methods and Data Analysis. Students are free to choose any modules within each discipline. The remaining 15 modules may be chosen freely, according to student's background and professional development.

3. Modules

A list of modules is offered by the consortium at the beginning of each academic year. Not all are offered in the same year, and new additional modules may be added to enrich the course. A list of the modules which were taught in the previous editions of EMQAL can be found in [Annex 1](#).

4. Policy and Management of EMQAL

1. Quality Policy of EMQAL

- **Mission:**

- capacity building and training of professionals capable of implementing and managing quality systems in analytical laboratories.
- to promote European cooperation and research leading to higher standards in laboratory quality management.

- **Vision:**

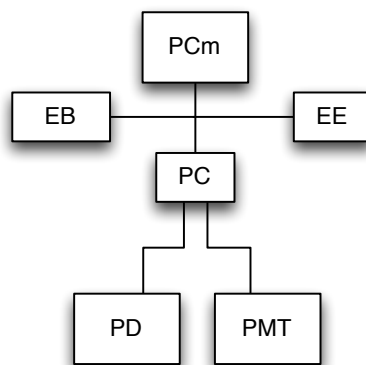
- to be a world reference in higher education for analytical laboratory professionals.
- to be a model of successful European cooperation.
- to promote international harmonization of analytical procedures.

- **Objectives:**

1. to develop adequate internal quality assurance mechanisms at three different levels:
 - the lectured modules;
 - the study programme;
 - the host institution facilities
2. to implement transparent external quality assurance mechanisms by the respective competent national authorities;
3. to collaborate with the national authorities and ENQA in establishing a common framework of reference for Quality Assurance

2. Management of EMQAL

The following are the management structures within the EMQAL:



PCm - Programme Committee

EB - Examiners Board

EE - External Examiner

PC - Programme Coordinator

PD - Programme Director

Overview of EMQAL 2008-2013

1. Candidates and Students

* one category A + one category B

editi on year	total number of candidates			number of accepted / very high quality candidates			Number of students					
	cat. A	cat. B	Total	cat. A	cat. B	Total	cat. A	cat. B	non-EM	Total	drop- outs*	gradua tes
2008	95	n.a.	95	32	n.a.	32	20	n.a.	5	25	1	24
2009	249	n.a.	249	150	n.a.	150	19	n.a.	2	21	0	21
2010	312	19	331	83	14	97	13	8	0	21	2	19
2011	268	10	278	131	8	139	9	5	2	16	1	13**
2012	305	15	320	149	12	161	10	5	0	15	0	0**
<i>total</i>							<i>70</i>	<i>18</i>	<i>9</i>	97		77

*Students leaving the course before completing the research thesis.

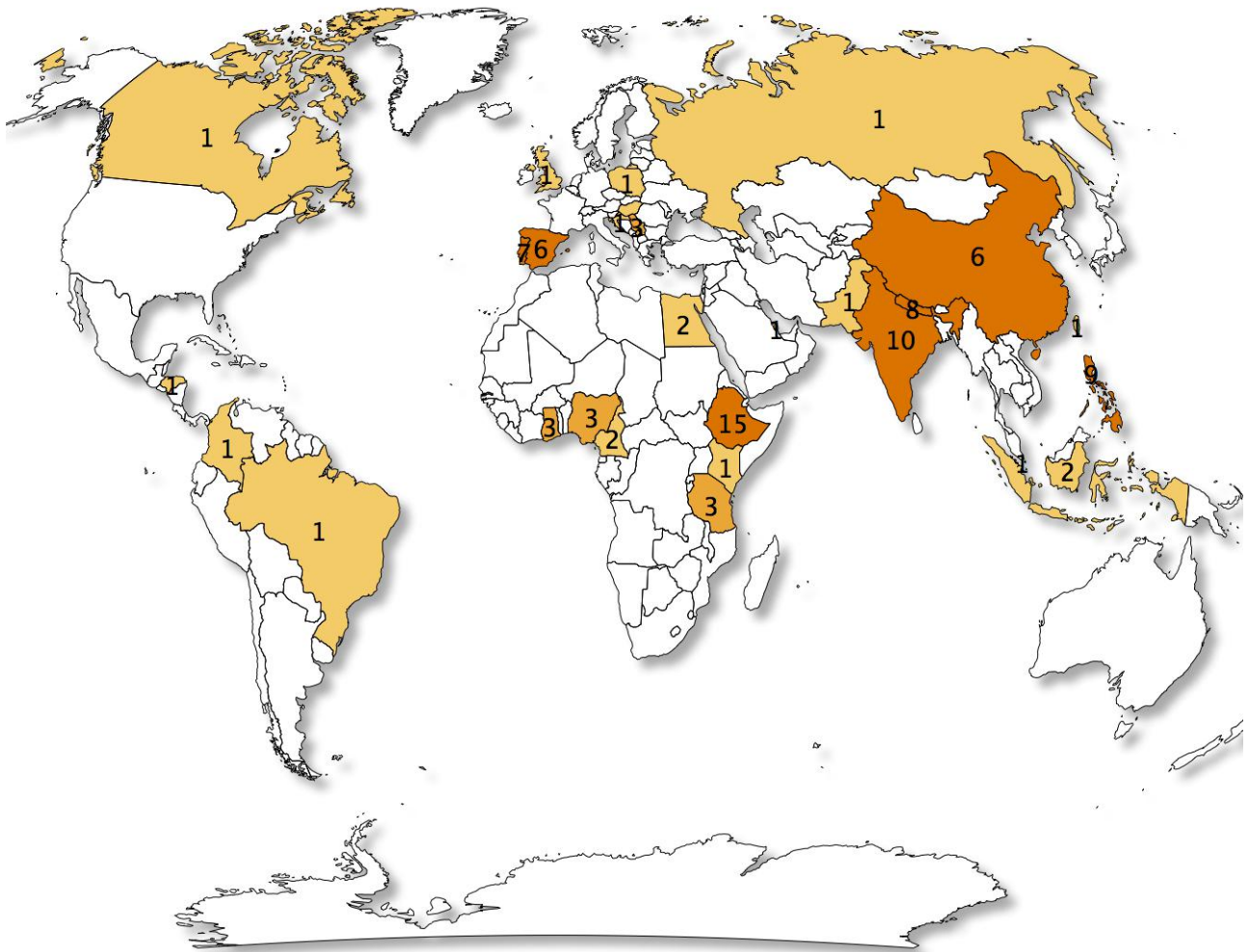
** by July 2013.

Justifications for the students leaving the course:

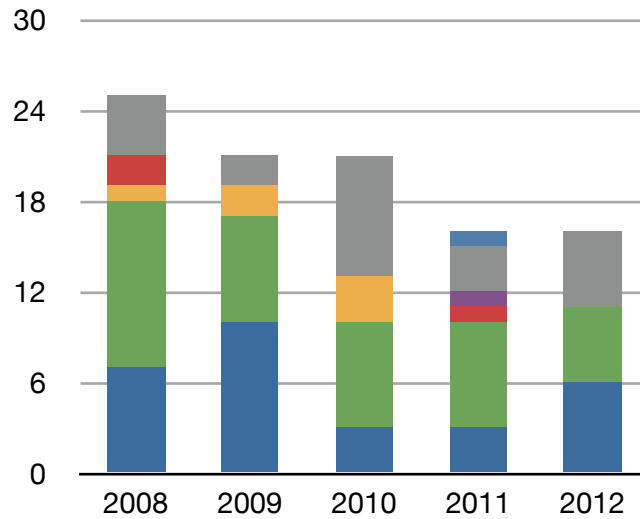
2008 - one self-paying student was offered a job in quality management which was incompatible with finishing the course (it was in a different city);

2010 - two category B Erasmus Mundus students left the course: one found the grant was insufficient to support his expenses, the other chose to take a different specialized course.

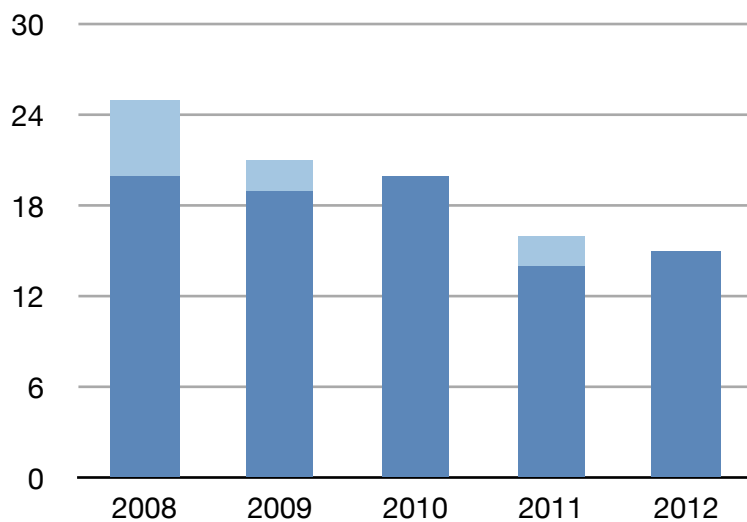
2011 - one self-paying student was only interested in the 1st curricular year, and did not take the research thesis.



Geographical Distribution of EMQAL students

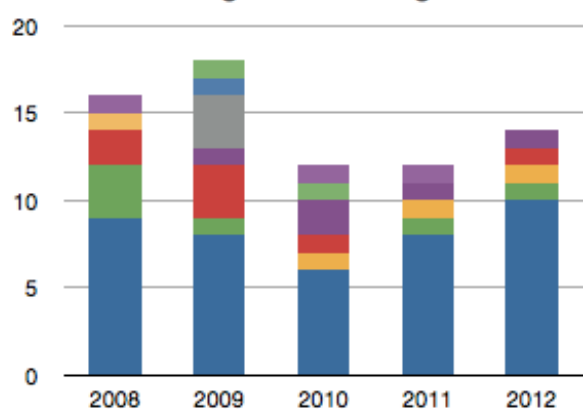


Number of EM scholarship holders

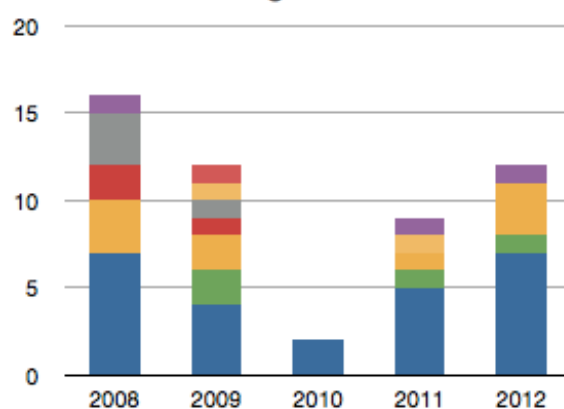


■ non EM scholarship holders
■ EM Scholarship holders

Student background - Undergraduate level



Student background - Master level



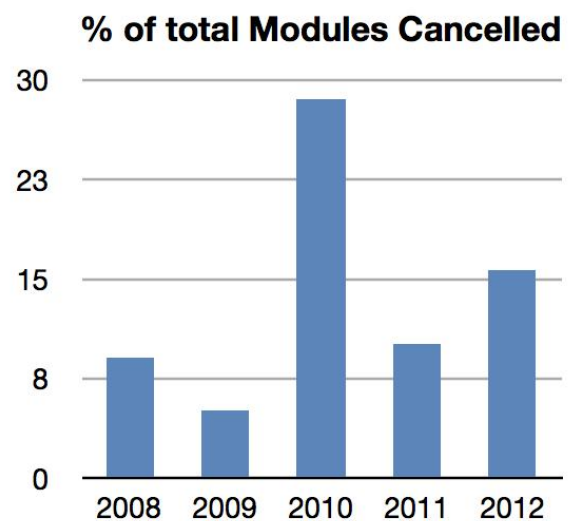
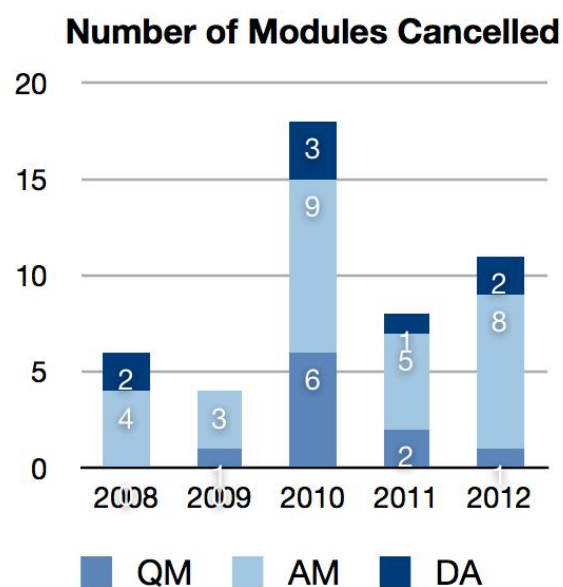
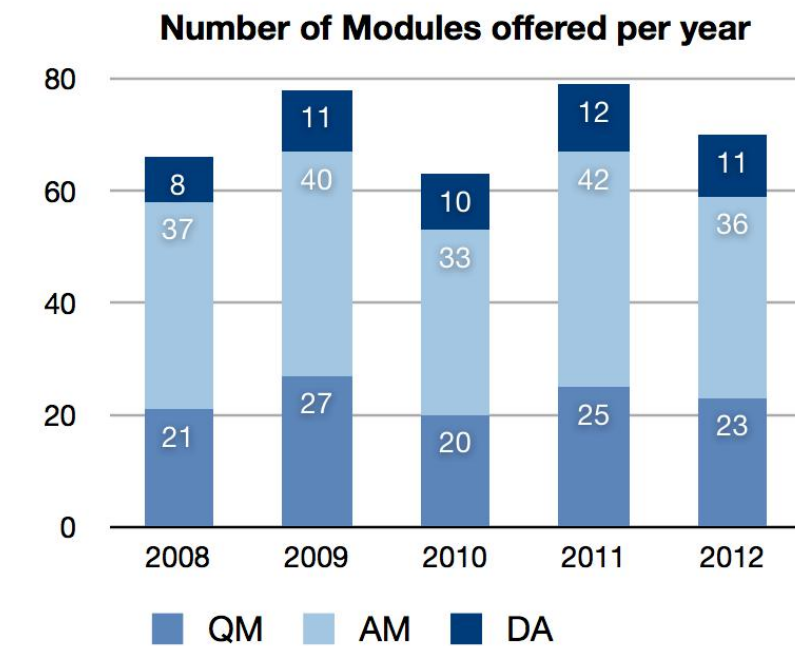
- Chemistry
- Pharmacy
- Microbiology
- Agricultural Sciences
- Environmental Sciences
- Others
- Biochemistry
- Biology
- Food Science
- Veterinary medicine
- Business studies

Gender distribution of EMQAL students

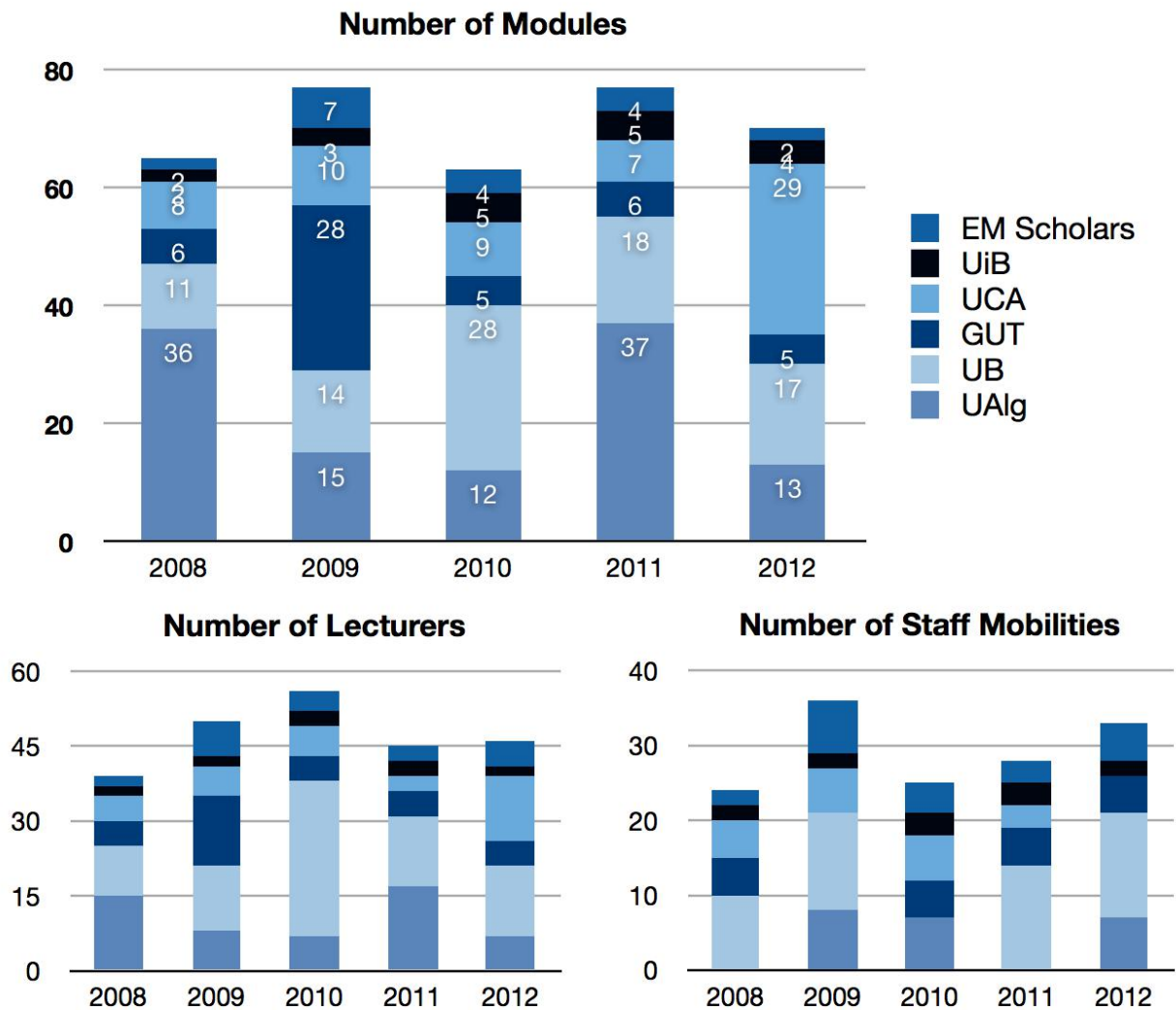


2. Number of Modules

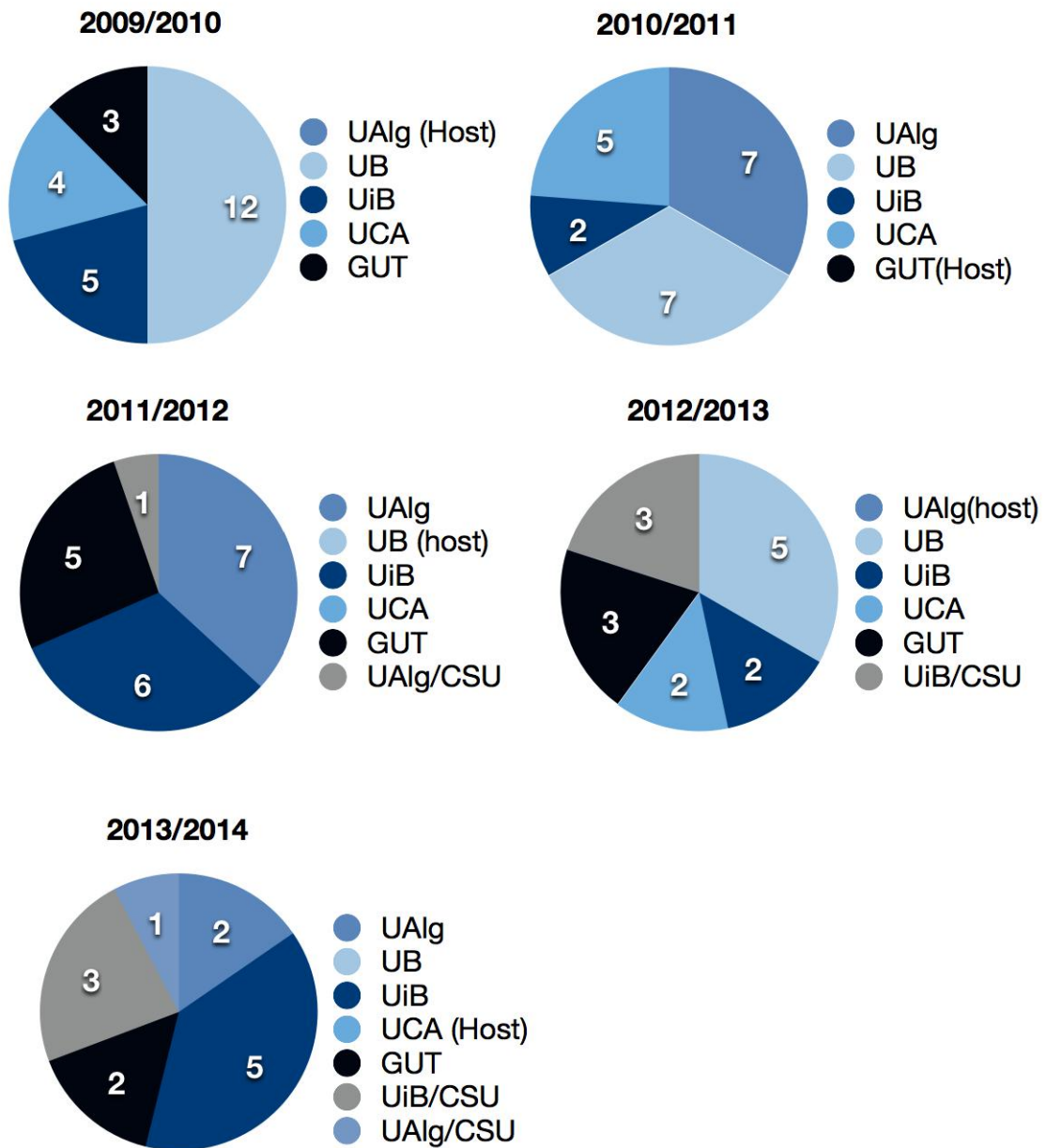
Distribution by discipline



Contribution by partner Universities



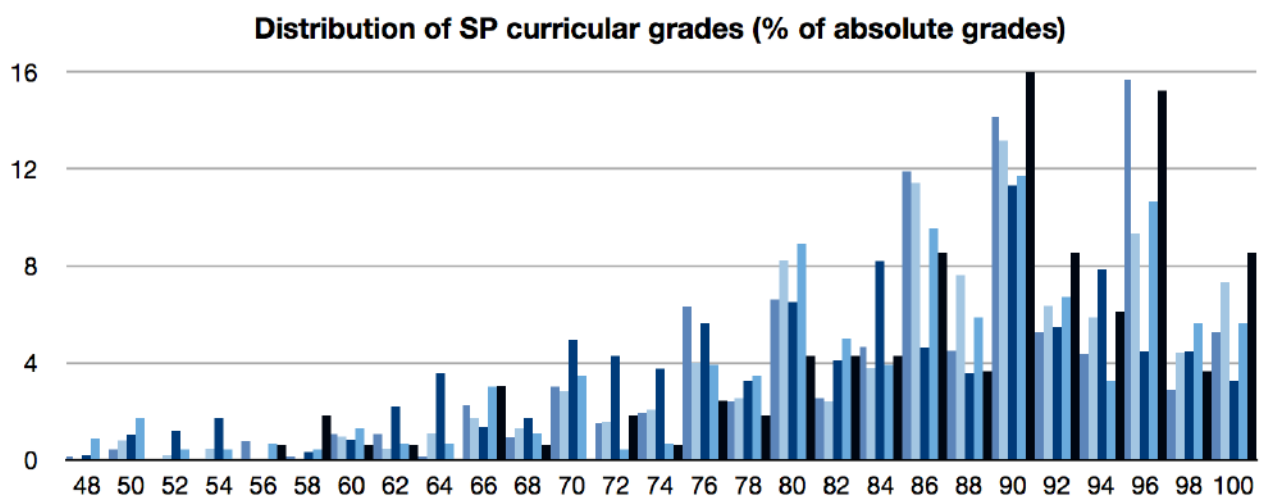
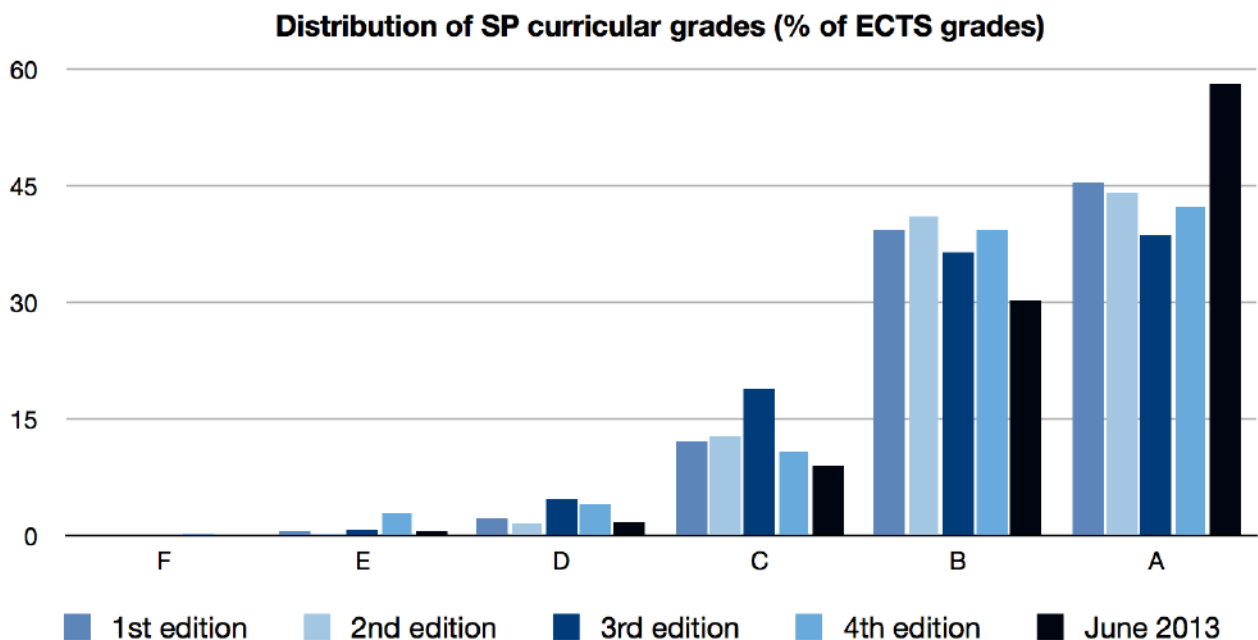
3. Distribution of Research Theses



4. Student's Performance

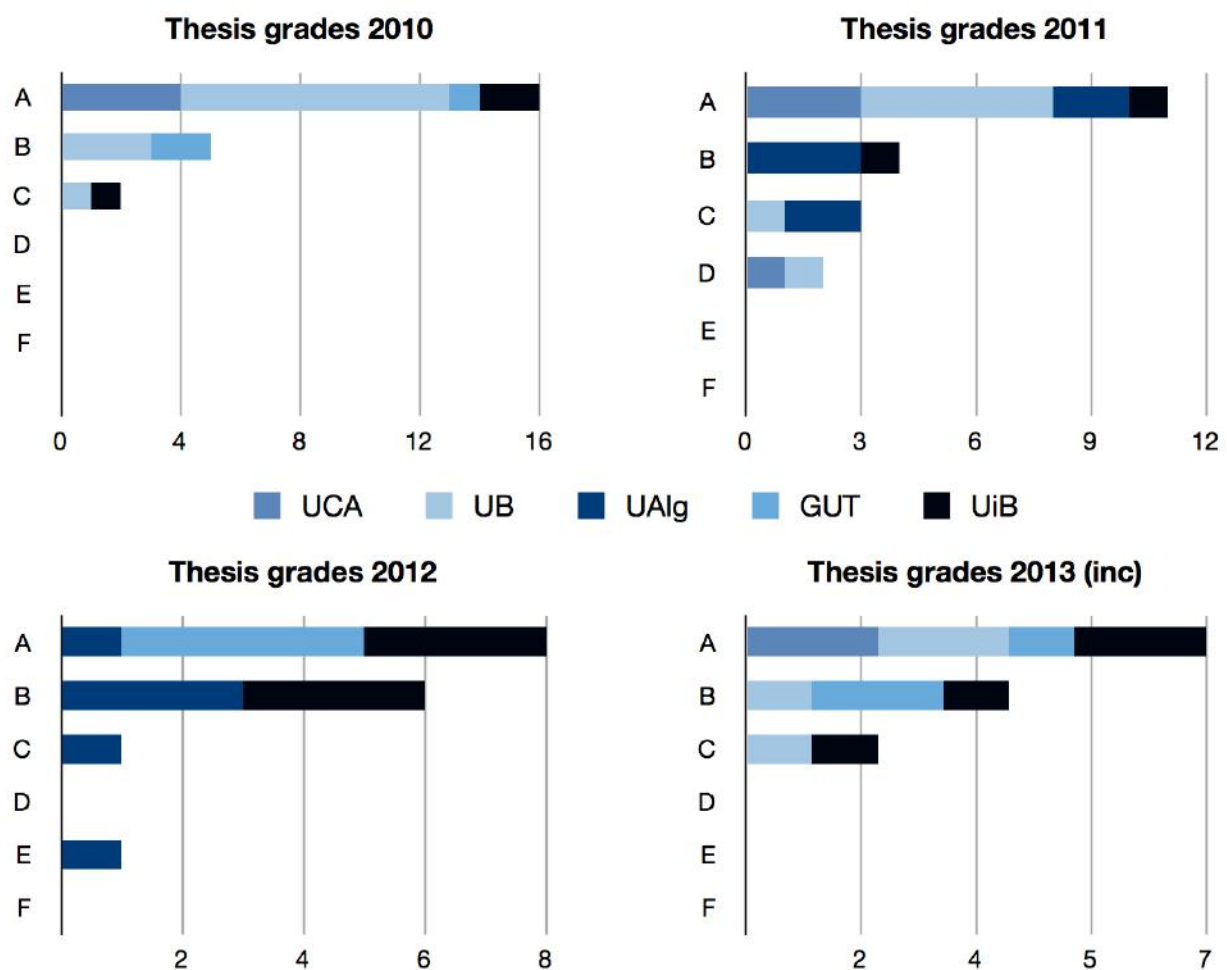
Curricular Year

In order to facilitate the transfer of grades between universities of the consortium, two different scales are used: an “absolute” grading scale (0-100%), and the ECTS grading scale (A-F). The average grade has been 85% in the first edition, 86% in the second, 82% in the third, 82% in the 4th and 87% in the current edition (from the results collected by June 2013).



Research Thesis

The distribution of grades for EMQAL research thesis is described in the following graphics. Research thesis have the duration of 6 months for all the research work, manuscript writing and thesis defense before a jury. The EMQAL Consortium has developed a set of rules to assure that similar evaluation criteria are used in different universities and different countries. These rules include the participation in every jury of one element from a different university of the Consortium.



Student initiatives

For each edition of EMQAL, two representatives (one for each 10 students) are elected among EMQAL students to participate in the Programme Committee. A student representative for the EMA (Erasmus Mundus Alumni Association) is selected in a separate election.

Elected student representatives:

	PCm	EMA
1st edition	Kumar Praveen (India) Glauce Pereira (Brazil)	Saif ur Rehman (Pakistan)
2nd edition	Nafiha Usman (India) Mary Grace Guardian (Phillipines)	Enoch Cobbina (Ghana)
3rd edition	Prabal Subedi (Nepal) Milan Chhaganlal (Portugal)	Abhiteja Konda (India)
4th edition	Leslie Euceda (Honduras) Nirajan Kshetry (Nepal)	Abhiteja Konda (India)
5th edition	Carlos Gonçalves (Portugal) Edgar Magas (Phillipines)	-

Student initiatives of note:

a) 1st edition

- starting and maintaining a mailing list for opportunities of employment and doctoral grants (careersemqal@gmail.com);
- preparing a small movie and a yearbook about the 1st edition of EMQAL;
- starting an alumni association for EMQAL students;
- student's meeting and report for the PCm;
- creating a webpage for exchange of information between EMQAL students about the cities of universities of the consortium: <https://sites.google.com/site/kaizen0emqal/>
- student Glauce Guimarães has started a Quality Management consultancy company in Brazil (Sustentare, www.sustentarebrasil.com.br)

b) 2nd edition

- preparing a small movie about the 2nd edition of EMQAL;
- creating a facebook page for EMQAL students and EMQAL alumni.
- one student (Enoch Cobbina) created a consultancy company in Ghana for laboratory accreditation (Granikemp, <https://sites.google.com/site/granikempcompanylimited/home>).

c) 3rd and 4th editions

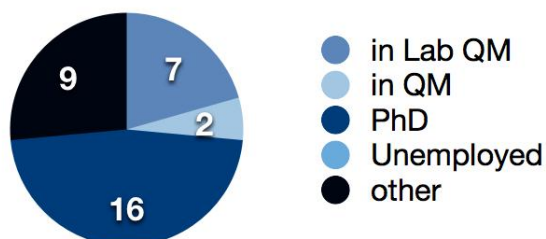
- preparing yearbooks for the 3rd and 4th editions of EMQAL.

5. Alumni Information

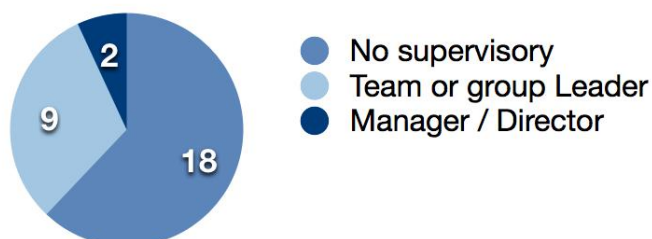
The third edition EMQAL graduates completed their master thesis by March 2012. A questionnaire was distributed to these alumni on June 2013. Nine students (47%) have replied by July 2013. Similar surveys were distributed in 2011 and 2012 with a participation of ten (48%) and fourteen (61%) students. The results of all 33 surveys are detailed below.

From the students who replied, the following relevant information could be gathered: regarding their current employment status, all were employed: 9 (27%) were working in quality management, which is the main objective of the course, and 16 (48%) were doing a PhD in an European country. Most (18, 54%) do not have supervisory responsibilities, which is natural of doctorates or young professional in the beginning of a career. All considered that EMQAL benefited their career, and all considered that EMQAL helped to obtain a job (12, 36%) or to improve performance or advance in the job (19, 58%). Most students (15, 45%) got a job less than one month after graduating from EMQAL. This may reflect the fact that some students already had a job in their home country and returned to it after completing the master. It confirms that their employers (companies and universities) approved and supported their studies in EMQAL. The remaining students took 1-6 months to find a job (12, 36%) and 5 (15%) took 6 to 12 months. From the students who replied to the survey none took more than one year to find a job. The average rate of satisfaction with their jobs is quite high, 4.2 in a scale of 1-5. Most graduates (16, 48%) returned home, 13 (39%) are working in European countries (Sweden, Norway, Spain and Germany) and 3 (0.1%) in other parts of the world (Singapore, USA, Brazil). 10 graduates (30%) consider their wages are above average, while 21 (64%) consider them average. No graduates considered their wages below average.

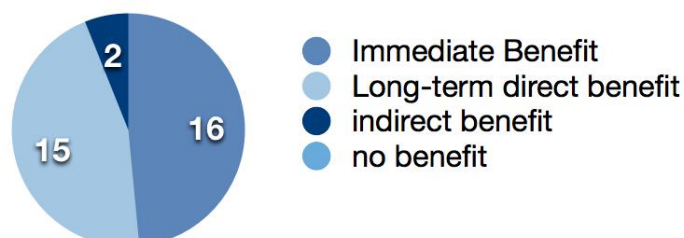
Current Employment Status



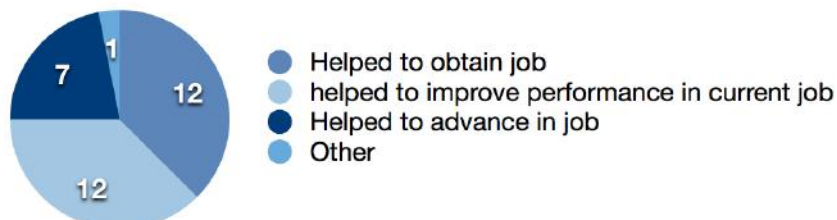
Responsibility Level



How did EMQAL influence your career



How did EMQAL help in your employment



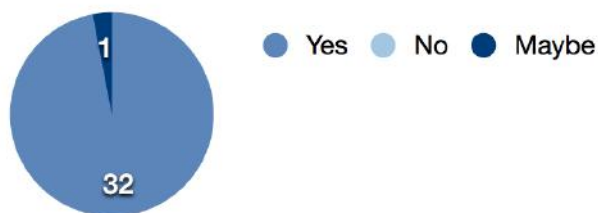
How long to obtain employment



Where are you working presently



Would you recommend EMQAL?



Comments from EMQAL Alumni 2010-2012

EMQAL has helped me develop not only my technical expertise and management skills but also my overall personality. The learnings and connections I have established (global connection) has helped me growing confidence to progress in my career in the food industry,.

It would be good if we could receive updates related to the issuing of diplomas.

When will we receive the documents from the university of Barcelona?

We have not received the diploma. It should be given as soon as possible as employers require it and when we apply for PhD

I want to wish an EMQAL is an admirable Programme. All professors showed the great intention, more skillful experiences in the laboratory to make me as a good dimension in my life.

Thanks to all professors for guiding us, inspiring us and making us what we are today.

EMQAL Programme is the most excellent in this world. Wherever I may go in my life, I will always remember that I had an excellent guide from this Programme.

I found guidance, friendship, discipline and love, everything, in one circle that is EMQAL.

I wish EMQAL, to make more students in a future with all success

If we would get our diploma, the course was perfect.

It was a great and helpful experience. I would repeat it and recommend it for sure. The only thing that could be better is to speed up the process of sending the diploma after graduation.

I've got plenty of experiences from EMQAL. My thesis defense was on May, 12 and I started PhD from August '12. In USA all the graduate students have to take proficiency exams before the semester start. I got the highest score in analytical chemistry among all and they took me as teaching assistant for senior students in analytical lab.

Current Academic Year: 2012/2013

1. Quality Assessment

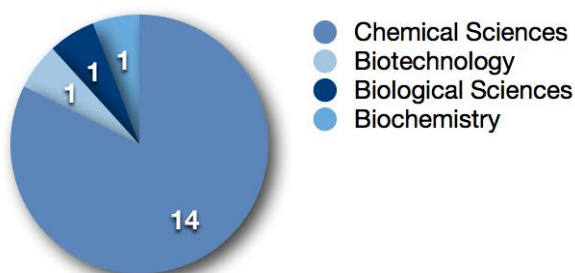
EMQAL students are asked to evaluate the course at three levels: the modules, the programme and the host institution. Evaluation of the modules is done through individual questionnaires. Only students who have chosen a module as part of their study plan are asked to evaluate it. The results of module evaluation collected for 2012/2013 by June 2013 can be found in Annex 2.

A general questionnaire about the conditions of the course, evaluating the whole programme and the host institution, was distributed to all students on May 2013. Seventeen (100%) replies were collected. The results are summarised below.

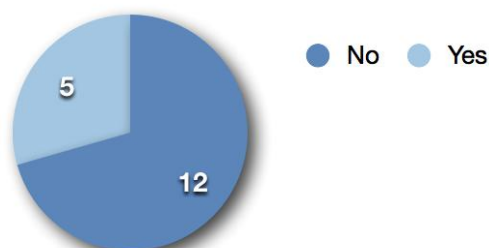
Annual Questionnaires

1. Study Experiences

What is the area of your former degree?

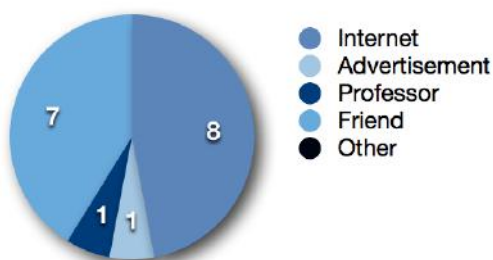


Did you study abroad before taking EMQAL?



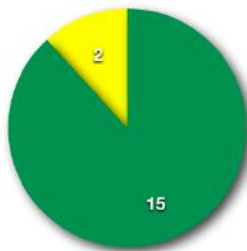
2. Information about Erasmus Mundus

How did you learn about Erasmus Mundus and EMQAL?

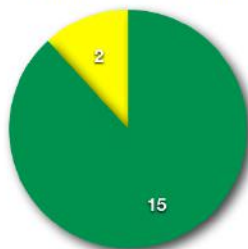


3. Assessment of the Erasmus Mundus Master Course

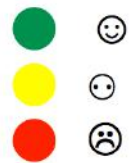
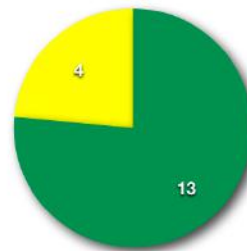
Professional Quality of the Programme Coordinator



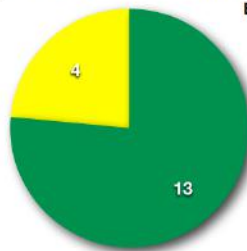
Professional Quality of the Programme Director



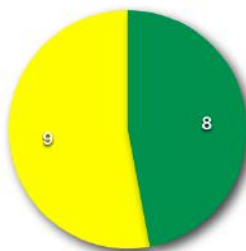
Academic Quality of Lectures



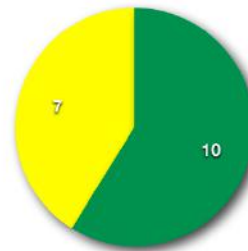
Composition and Content of the Curriculum



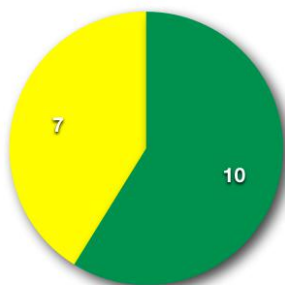
Pedagogic Quality of Lectures



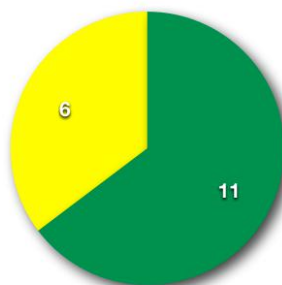
Balance between lectures, group work and other forms of study



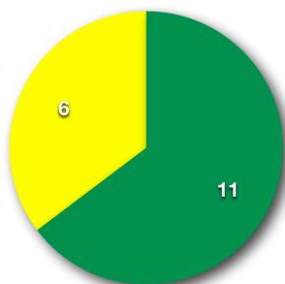
Balance between lectures and self-initiated study



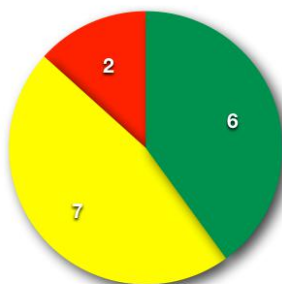
Help, access to and time devoted to you by the academic staff



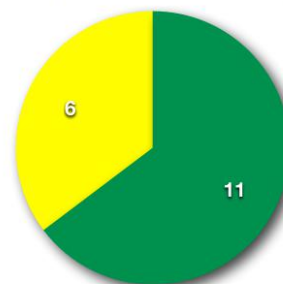
Service from the administrative staff



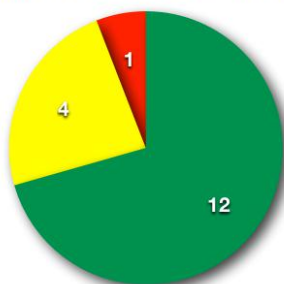
Service from the international office



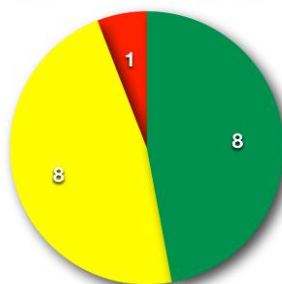
Quality and access to the library



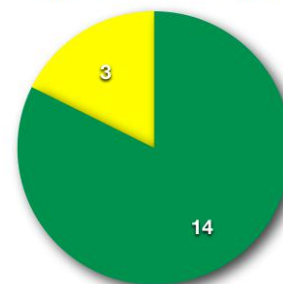
Quality and access to the laboratories



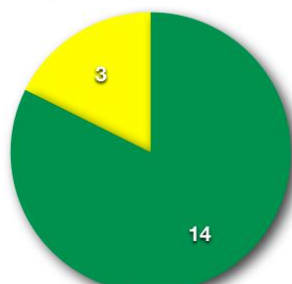
Quality and access to the computing facilities



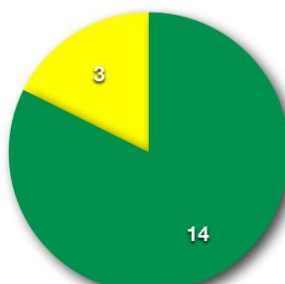
Quality and access to the internet



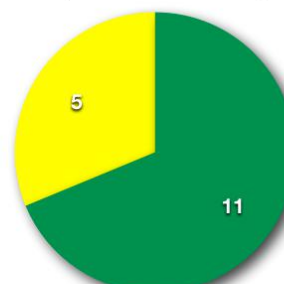
Quality and access to the canteen



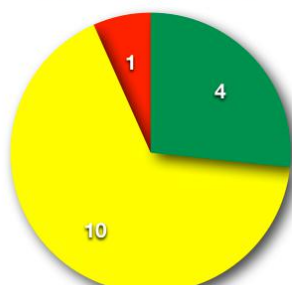
Quality and access to accommodation



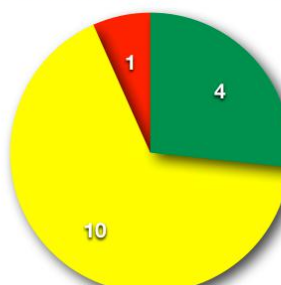
Quality and access to transport



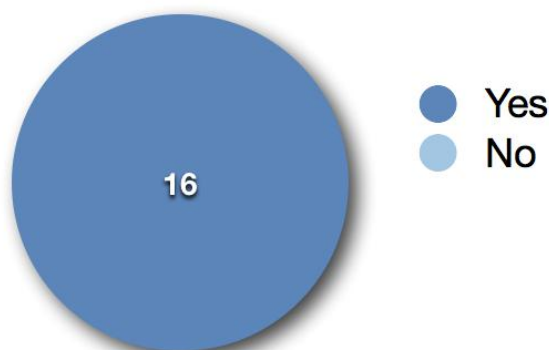
local language training



Integration Activities (welcome programme, mentoring and guidance from staff, help from local students and alumni, etc)



Would you recommend EMQAL?

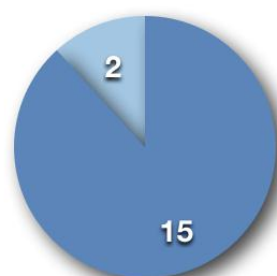


The best in EMQAL	The worst in EMQAL
I want to especially comment on the EMQAL coordinator in UCA. The professor is "exceptionally perfect" always responding to students needs in a timely manner. He just awesome in his duty.	Much demanding academic rigor. No much fun, I was all about studying studying. The EMQAL programme is very much demanding. In any case that's why I love it.
The master course not only imparts theoretical part but also practical aspects, which are important for a student.	Probably the worse feature is the language barrier specially to those professor who find it hard to express their selves in English. Sometimes, the thought that they want to express are not grasp by the students because of this barrier. The host institution is okay but we did not have friends outside our program. Most of the Spanish people do not speak English.
Expert from different EU universities make its more dynamic and contemporary with present situation of quality of analytical laboratory . Program director as well as university is always caring with not only on study course but also on caring about the personal problems of the students on time.	I didn't find any bad feature.
Very good academic program which is not difficult for students and the host university is very good they present everything they can such as laboratories	Evaluation by some professors are not consistent or questionable.
The modules offered are very good, the course are delivered according to the schedule, the practical and teaching experience of some professors is very good.	don't have worst thing
Highly organized and planned master. The university has helpful staff.	The teaching experience and evaluation system of some instructors is very poor.
Helpful and very welcoming	Many lecturers, although knowledgeable, are ineffective teachers - they just read the slides, give examples in other language, and the others have difficulty in speaking in English. Communication skills should not be taken for granted.

The best in EMQAL	The worst in EMQAL
well organized both of them, the idea gathering student from all over the world, most of teachers coming with large professional background on the proper area where they were teaching us.	Some professors do not differentiate between what they want and the standard requirements
teachers for different field and Universities	Some lecturers did not have a good level of English
Opportunity to personalize the study plan according to our needs/interests, and the lecturers have know-how in the working field. The host institution has good physical infrastructures.	to be more practical, to see and touch things , to have that possibility from the emqal program, not just theoretical.
	classes only one week
	The dependence on public transports can be a limiting factor, and somehow not very pleasant in what it matters to the unpredictability of the schedule. The host institution could have a better organization of the international office, in what concerns the advertisement or the information of the Erasmus Mundus students, as well as a department of social services to provide an organized system of accommodation opportunities, or official university accommodations.

4. Living Circumstances

Where are you living?



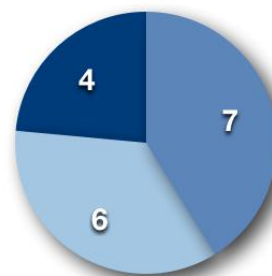
● Private accommodation
● University Accommodation

Are you satisfied?



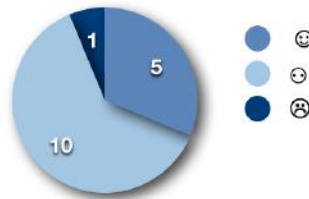
● Yes ● No

How much do you spend per month?

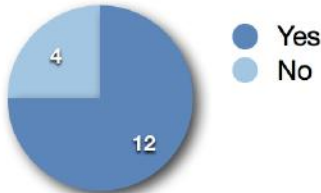


● <500 €
● 500-700 €
● 700-900 €

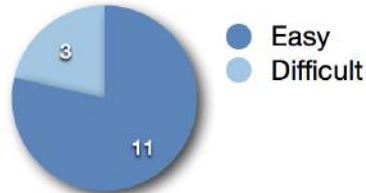
How do you assess life at the university with local and international students?



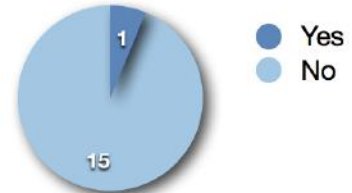
Do you have friends at the university?



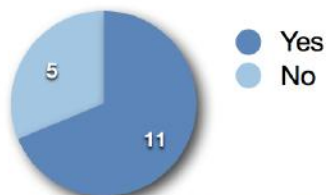
Is it difficult to contact European students?



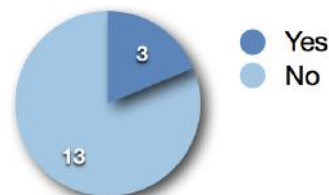
Do you participate in university groups?



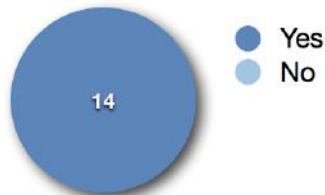
Do you have friends outside the university?



Do you participate in extra-university groups?



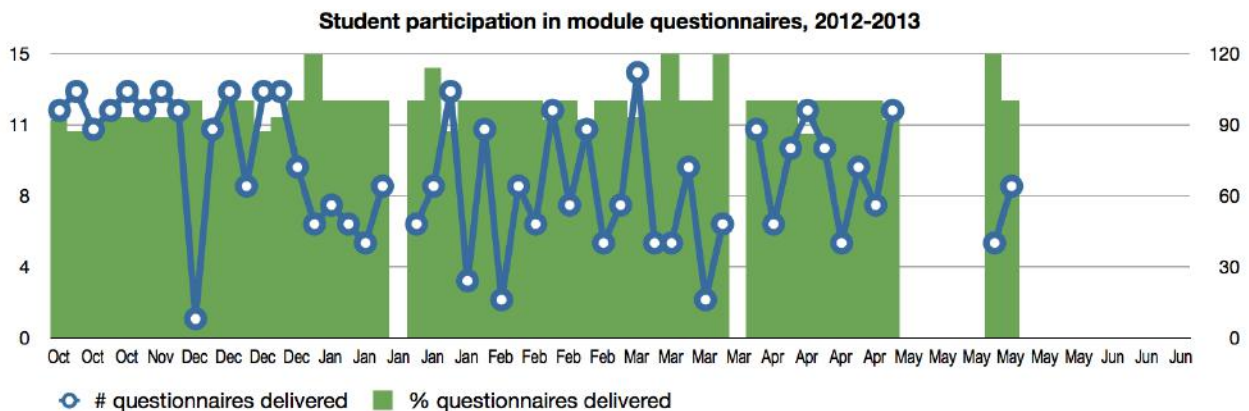
Do you feel accepted / integrated?



Improvements relative to previous editions

1. Student's participation in module questionnaires

In previous EMQAL editions the participation of students filling module questionnaires was high at the start of classes and decreased along the academic year, with the last modules receiving few evaluations from students. This has improved in the 4th edition, but not satisfactorily enough. In the 5th edition, questionnaires were made available to all students, unlike the 4th edition when they were only available to students taking the module as part of their study plan. The results are strikingly better (see figure below), with almost 100% participation throughout the course - even considering that some questionnaires received more than 100% participation.



the modules (mainly chromatography, spectrophotometry, potentiometry). A few project supervisors had expressed serious concerns about the laboratory practical skills of the EMQAL students they supervised. As such, it was decided that in the fourth edition QM0803 would start in the beginning of the academic year with a practical test to assess student's laboratory experience. Students who showed difficulty doing this test would be advised to take regular laboratory practical training along the academic year.

In the 5th EMQAL edition, the lab skills test involved three lab practices: 1) preparation of solutions, 2) precipitation, filtration and centrifugation and 3) acid-base volumetries. According to the three lecturers involved, all students have shown a great interest in this practical module and all have carried out practices in a satisfactory manner, obtaining good results in the final evaluation, both practical and theoretical.

Three students arrived after the lab skill module was run: Zhaneta Shala, Romanus Abia Ogechukwu and Anabel Medina Martínez . Because all of them have run modules with lab sessions, including some of the modules listed below, proficiency in lab was checked for all of them. No problems were found during lab work for these students.

Modules with lab sessions attended by some of the three late arriving students:

AM0903 Introduction to Chromatographic Techniques

AM0919 Gas Chromatography

AM0920 Liquid Chromatography

AM0910 Atomic Spectroscopy

AM0106 Water –Microbiological Analysis

AM0311 Virology

AM0915 Potentiometric Techniques

AM0204 Foods - Microbiological analysis

AM0921 Voltammetric Techniques

AM0307 Medical Microbiology

AM0207 Extraction Methods for Solid Foods

AM0305 Urine and Body Fluids Analysis

AM0923 Solid Phase Extraction

AM0503 Soil and Sediment Analysis

AM0104 Water –Metal Analysis

Follow up of corrective actions from previous editions

Below is a list of the anomalies detected and improvements suggested during the previous years of the EMQAL which were not completely solved. The corrective actions that have been decided are listed, as well as some comments on the results of these actions.

	Problem / suggestion	Corrective action	Results (UAlg 2012)	Results (UCA 2013)
4	student complains over specific modules, namely modules on clinical analysis (AM0304 and AM0305)	The modules were either removed or assigned to different lecturers	<i>Serious problems with AM0306 and some with AM0304. Excellent results for AM0305.</i>	<i>No problems detected on clinical analysis modules.</i>
5	student complaints over language (english) difficulty with some lecturers	English proficiency of invited lecturers is to be stressed.	<i>No serious complaints, but some comments on several modules regarding the english proficiency of lecturers</i>	<i>Several comments on modules regarding the english proficiency of lecturers</i>
7	Complaints about accommodation	The conditions of student accommodation should be left clear to new students before their arrival.	<i>Complaints are mainly related to internet access and sharing room/ apartment. Much fewer complaints about UAlg accommodation than in 2008.</i>	No complains related to accommodation.
15	It is desirable to increase the laboratory component in the course, but assuring there is a quality assessment approach	To reserve two weeks in July for laboratory skills and fieldwork skills	<i>There are still complaints, but the last week of QM0803 takes place after the questionnaires are filled. A more specific survey can be arranged, but still this seems like an impossible issue to be completely satisfied due to the structure of the course!...</i>	No complains on the need to increase the laboratory component were received.

	Problem / suggestion	Corrective action	Results (UAlg 2012)	Results (UCA 2013)
16	Improvement of the Study Plan - new modules	Proposed by the PCm since 2009*: DA0204 QM0705 QM0504 QM0106 QM0108 QM0207 Proposed in 2011: QM0208 QM0602	It was not possible to organize QM0207-LIMS, and this module cancelled. QM0208 Risk management and QM0602 Communication were not offered.	LIMS was offered, but it was not taught due to the low number of students choosing it.
18	Cancelled modules limit student's choice (AM0304, AM0305 AM0307)		The number of cancelled module was much lower than in the 3rd edition (see graphic in section 2).	The number of cancelled modules was higher than the previous edition, but justified by running costs.
19	Low number of European candidates		Number of EU candidates increased, but it is still very low.	
20	Very low laboratory skills of some students may seriously affect experimental thesis		A laboratory skills "test" showed that several students have serious limitations due to lack of previous laboratory practice.	laboratory skills tests did not reveal any significant training needs in students of this edition.

*DA0204-Uncertainty in Clinical Labs; QM0705 - Security in Clinical Labs; QM0504 - Internal Quality Control; QM0106 - Good Laboratory Practice; QM0108 - Quality Management Tools; QM0207 - LIMS; QM0208 Risk Assessment; QM0602 Communication Techniques in Laboratory Audits;

Pilot Single Accreditation Procedure

EMQAL was evaluated in the Pilot Single Accreditation Procedure within the JOQAR project “Joint Programmes: Quality Assurance and Recognition of Degrees Awarded”. A visit of a panel of experts to the UCA, host of the 5th EMQAL edition, took place in 12-13 December and was very productive. The panel has evaluated the EMQAL as excellent regarding General Conditions, Intended Learning Outcomes, the Programme, and the Internal Quality Assurance. In particular, the experts panel was impressed by the documentation structure of EMQAL, and considered a good practice “the inclusion the Quality Policy and the Quality Manual as an integrating part of the Cooperation Agreement. This proves a full agreement between partners in all the aspects related to the master programme, not only the organizational ones but those related to the content and development of the curriculum”. The Facilities and Student Support and the Teaching and Learning were evaluated as Good.

The following points were noted for further improvement of the EMQAL:

- Inclusion of periods of internship in industry or private laboratories during the year of research project;
- organizing during the year of classes encounters with industry representatives to discuss the needs in specific fields;
- feedback from research project students and supervisors should be sought;
- feedback from employers should be increased;
- socialization of EM students with locals should be promoted;
- devoting continuous attention to the proficiency in the use of English language by the lecturers;
- setting up measures to assure all research theses include a Quality Assurance / Quality Control component.

Annex 1 - Modules taught in the 1st 5 editions of EMQAL

Annex 2 - Results of collected module questionnaires 2012/2013

Quality Management	2008/2009 Host: UAlg	2009/2010 Host: GUT	2010/2011 Host: UB	2011/2012 Host: UAlg	2012/2013 Host: UCA
QM01 - Quality Systems					
QM0101 European Quality Policy and Infrastructures	UAlg	UAlg	Ualg	UAlg	UAlg
QM0102 Introduction to Quality Management	UAlg	UAlg	Ualg	UAlg	UAlg
QM0103 ISO 9000 and ISO 14000 Systems					
QM0104 Laboratory Quality Systems: ISO/IEC 17025	UB	UB	UB	UB	UB
QM0105 HACCP AND ISO 22000	UAlg	GUT	UB	UAlg	UB
QM0106 Good Laboratory Practice		UB	UB	UB	UB
QM0107 Laboratory Quality Systems: ISO 15189	UAlg	UAlg	Ualg	UAlg	UAlg
QM0108 Quality Management Tools		GUT	GUT	GUT	GUT
QM0109 How to convert an Analytical Laboratory into an Accredited Laboratory				EM scholar	
QM02 - Management					
QM0201 Business Management					
QM0202 Human Resources		UB	UB	UB	UB
QM0203 Managing Instalations, Equipment and Consumables	UAlg	UAlg	Ualg	UAlg	UAlg
QM0204 Quality Systems Documentation	UB	UB	UB	UB	UB
QM0205 Financial Accounting					
QM0206 Cost Accounting					
QM0207 Laboratory Information Management Systems (LIMS)			UB		UB
QM0208 Risk Assessment					
QM03 - Traceability					
QM0301 Metrology	UoM	UoM			
QM0302 Calibration and Verification	UB	UB	UB	UB	UB
QM0303 Proficiency Testing Schemes					
QM0304 Preparation and Use of reference Materials					
QM0305 Quality of Analytical Results, Traceability					
QM0306 Proficiency testing Schemes and Certified Reference Materials	UB	UB	UB	UB	UB
QM05 - Methods of Analysis					
QM0501 Method research					
QM0502 Method validation	GUT	GUT	GUT	GUT	GUT
QM0503 Technical Writing	GUT	GUT	UB	UAlg	UB
QM0504 Internal Quality Control		GUT	UB	UB	UB
QM06 - Quality Audits					
QM0601 Laboratory Audits (EN ISO 19011)	UAlg	GUT	GUT	UAlg	UAlg
QM0602 Communication Techniques in Laboratory Audits					
QM07 - Safety					
QM0701 Chemical Safety and REACH regulations		UB	UB	UB	UB
QM0702 Management of Dangerous Materials and REACH regulations					
QM0703 Industrial Hygiene					
QM0704 Laboratory Design					
QM0705 Security in Clinical Labs		Cancelled			
QM0706 Food Safety Management Systems (ISO 22000)					
QM08 - Postgraduate skills[1]					
QM0801 Language course - Intensive "survival" portuguese	UAlg				
QM0802 IT Tools	UAlg	GUT	UB	UAlg	UCA

QM0803 Laboratory Skills (Basic)	UAlg	GUT	UB	UAlg	UCA
QM0804 Fieldwork Skills	UAlg	GUT	UB	UAlg	UCA
QM0805 Research Skills	UAlg	GUT	UB	UAlg	UCA
QM0806 Language course - Portuguese	UAlg				
QM0807 Language Course - English	UAlg				
QM0808 Communication skills	UAlg	GUT	UB	UAlg	UCA
QM0809 Language course - Intensive "survival" Polish		GUT			
QM0810 Chemical Documentation			UB		
QM0811 Language course - Intensive "survival" Spanish			UB		
QM0803 Laboratory Skills (Advanced)				Ualg	
Analytical Methods					
AM01 - Natural Water Analysis					
AM0101 Water Directive and CEN Standards	UAlg	UAlg	Ualg	UAlg	UAlg
AM0102 Water – sampling and General Characterization	GUT	GUT	GUT	GUT	GUT
AM0104 Water —Metal Analysis	UCA	UCA	UCA	UCA	UCA
AM0105 Water —Analysis of Organic Components	GUT	GUT	GUT	GUT	GUT
AM0106 Water —Microbiological Analysis	UAlg	UAlg	UB	UAlg	UCA?
AM02 - Food Analysis					
AM0201 Official Food Control Directive and CEN Standards					
AM0202 Foods - Metal analysis in organic matrices					
AM0203 Foods – Organic Contaminants analysis					
AM0204 Foods - Microbiological analysis	UAlg	UAlg	UB	UAlg	UCA?
AM0205 Foods – Sample treatment	UB	UB	UB	UB	UB
AM0206 Functional Foods Analysis	UCA	UCA	UCA	UCA	UCA
AM0207 Extraction Methods for Solid Foods	UCA	UCA	UCA	UCA	UCA
AM0208 Electronic Noses for Food Control				UAlg	
AM0209 Analytical Methods for the Determination of Mycotoxins in Food		EM Scholar			Scholar
AM03 - Clinical Analysis					
AM0301 in Vitro Directive and CEN Standards	UAlg	UAlg	Ualg	UAlg	UAlg
AM0302 Instrumentation and automation in Clinical Analysis					
AM0304 Clinical Pathology	UAlg	GUT	UB	UAlg	UCA
AM0305 Urine and Body Fluids Analysis	UAlg	GUT	UB	UAlg	UCA
AM0306 Haematological Analysis	UAlg		UB	UAlg	UCA
AM0307 Medical Microbiology	UAlg	GUT	UB	UAlg	UCA
AM0308 Interpreting Laboratory Results					
AM0309 Fundamentals of Biochemical Analysis	UAlg	UAlg	UB	UAlg	UAlg
AM0310 Genetic Testing	UAlg	UAlg	Ualg	UAlg	UAlg
AM0311 Virology				UAlg	UCA
AM0312 Neonatal Screening of Congenital Diseases		EM Scholar			
AM0313 Development of metal compounds for inorganic medicinal chemistry	EM Scholar				
AM04 - Industrial Analysis					
AM0401 Industrial sampling					
AM0402 Process Analytical Chemistry					
AM05 - Environmental Analysis					
AM0501 Trace Metal Water Speciation	UAlg	UAlg	Ualg	UAlg	UAlg
AM0502 Atmospheric Analysis	GUT	GUT		GUT	GUT
AM0503 Soil and Sediment Analysis	UB	UB		UB	UB
AM0504 Monitoring Networks					

AM0505 Analysis and Speciation of Trace Metals in Sediments and Natural Waters					
AM0506 Tracing Sewage in the Environment	UAlg				
AM06 - Solid-Phase Analysis					
AM0601 Techniques of Surface Analysis					
AM0602 X-Ray Techniques					
AM07 - Biochemical Analysis					
AM0701 Immunochemical Analytical Techniques	UAlg	GUT	UB	UB	UB
AM08 - Sampling					
AM0801 Design of Sample Strategies and sampling techniques	UB	UB	UB	UB	UB
AM0802 Sample handling, storage and treatment					
AM0803 Introduction to Artwork Analysis					UB
AM09 - Advanced Techniques of Analysis					
AM0901 Fundamentals of Chemical Analysis					
AM0902 Advanced Volumetric Analysis	UB	cancelled	UB	UB	UB
AM0903 Introduction to Chromatographic Techniques	UAlg	GUT	UB	UAlg	UCA
AM0919 Gas Chromatography	UAlg	GUT	UB	UAlg	UCA
AM0920 Liquid Chromatography	UAlg	GUT	UB	UAlg	UCA
AM0904 Electrophoresis	UAlg	GUT	UB	EM Scholar	EM Scholar
AM0905 Capillary Electrophoresis					
AM0907 Molecular Spectroscopy	UCA	UCA	UCA	UCA	Ualg
AM0908 Vibrational Spectroscopy	UiB	UiB	UiB	UiB	UiB
AM0909 Quantitative IR Spectroscopy	UCA	UCA	UCA	UCA	UCA
AM0910 Atomic Spectroscopy	UAlg	GUT	UB	UAlg	UCA
AM0911 ICP-MS					
AM0912 Mass spectrometry	UB	UB	UB	UAlg	UB
AM0913 Hyphenated Techniques					UB
AM0914 Introduction to Electroanalytical Techniques	UB	UB	UB	UB	UB
AM0915 Potentiometric Techniques	UAlg	GUT	UB	UAlg	UCA
AM0916 Sensors and Biosensors		UCA	UCA	UCA	UCA
AM0917 Radiochemical Techniques					
AM0918 Flow Injection Analysis	UB	UB	UB	UB	UB
AM0921 Voltammetric Techniques	UAlg	cancelled	UB	UAlg	UCA
AM0922 Method Development in HPLC		EM Scholar			
AM0923 Solid Phase Extraction		cancelled	cancelled	UCA	UCA
AM0924 Microextraction Techniques		EM Scholar			
AM0925 Quality Parameters and Optimization in Chromatography			UiB	UiB	UiB
AM0926 Application of Nanomaterials in the Analytical Laboratories			UCA	UCA	UCA
AM0927 The practice of Capillary Electrophoresis: optimization and method			EM Scholar	EM Scholar	
AM0928 Green Analytical Chemistry					UCA
Data Analysis					
DA01 - Basic Statistics					
DA0101 Measuring variability and Error Propagation	UAlg	UAlg	Ualg	UAlg	UAlg
DA0103 Regression Analysis	GUT	GUT	GUT	GUT	GUT
DA0104 Statistical Decision and Analysis of Variance	UB	UB	UB	UB	UB
DA02 - Uncertainty Measurement					
DA0201 Introduction to Uncertainty Measurement	UAlg	UAlg	Ualg	UAlg	UAlg
DA0202 Uncertainty Measurement in Physical Tests and Calibration					

DA0203 Uncertainty Measurement in Chemical and Microbiological Tests	UAlg	UAlg	Ualg	UAlg	UAlg
DA0204 Uncertainty estimation in Clinical Analysis			Ualg	UAlg	UAlg
DA03 - Chemometrics					
DA0301 Experimental Design and Optimization	UCA	UiB	UiB	UiB	UiB
DA0302 Pattern Recognition and Classification	UCA	UCA	UCA	UCA	UCA
DA0303 Signal Processing					
DA0304 Modelling					
DA0305 Experimental Design					
DA0306 Fundamentals of Multivariate data analysis	UiB	UiB	UiB	UiB	UiB
DA0307 Latent Variable Regression Techniques			UiB	UiB	UiB
DA0308 Curve resolution for two-way data sets					
DA0309 Curve resolution for multiset and multi-way analysis					
DA0310 Classification Techniques					
DA0311 Multivariate Calibration		UCA	UB	UB	UCA
DA0312 Process Analysis: Modeling and non.linear parameter fitting		EM Scholar	EM Scholar:		
DA0313 Multivariate Analysis of Metabonomic and Proteomic Spectral Profiles			UiB	UiB	UiB
DA0314 Curve Resolution			UB	UB	UB



Erasmus Mundus Master in Quality in Analytical Laboratories



Annual Report of the Examiners' Board - Part 2

University of Barcelona

July 3, 2013

Summary	2
The new EMQAL	4
Edition 2013/2015	5
1. Candidates	5
2. Study Plan	6
Modules	6
Research Thesis	6

Summary

The Part 2 of the Annual Report of the Examiners' Board summarizes the main changes in the new EMQAL project, now called Erasmus Mundus Master in Quality in Analytical Laboratories, as respect to the previous one. EMQAL has been selected again inside the Erasmus Mundus Programme in the 2012 Application Call. This Part 2 also provides the plans for following editions. It is intended to be the basis for the discussion and approval by the PCm of the list of modules and research topics for the next edition of the course.

The new EMQAL

The main features of EMQAL have been described in detail in the Part 1 of the report. Here only the most relevant changes are highlighted.

In 2012 EMQAL was selected again by the EC for funding under the Erasmus Mundus Programme for 5 editions from 2013, in a project coordinated now by the University of Barcelona.

The master has been renewed by the following consortium of universities:

University of Algarve (UAlg, Portugal, PT)

University of Barcelona (UB, Spain, ES)

University of Bergen (UiB, Norway, NO)

University of Cádiz (UCA, Spain, ES)

Gdansk University of Technology (GUT, Poland, PL)

Central South University (CSU, China)

Novosibirsk National Research State University (NSU, Russia)

University of São Paulo (USP, Brazil)

Additionally *ca.* of 20 institutions have been incorporated to EMQAL as Associated Partners (see Table 1 in Annexes).

The structure of the master will be similar, but from 2013 onwards EMQAL will be expanded to 24 months (120 ECTS) with one year of classes and one year of research thesis, instead of the 6 months research thesis running until now.

The tentative calendar for Host Institutions for next editions is:

Academic Year	Host
2013/2014	UB
2014/2015	UiB
2015/2016	UAlg
2016/2017	UCA
2017/2018	GUT

More information can be found at the EMQAL website: www.emqal.org.

Edition 2013-2015

1. Candidates

The total number of candidates that applied in the Application Call 2012 was of 232, corresponding to 51 different nationalities (see Figure 1). Of these candidates, 119 were considered as eligible ones and 113 as non-eligible ones by the EMQAL Selection Committee.

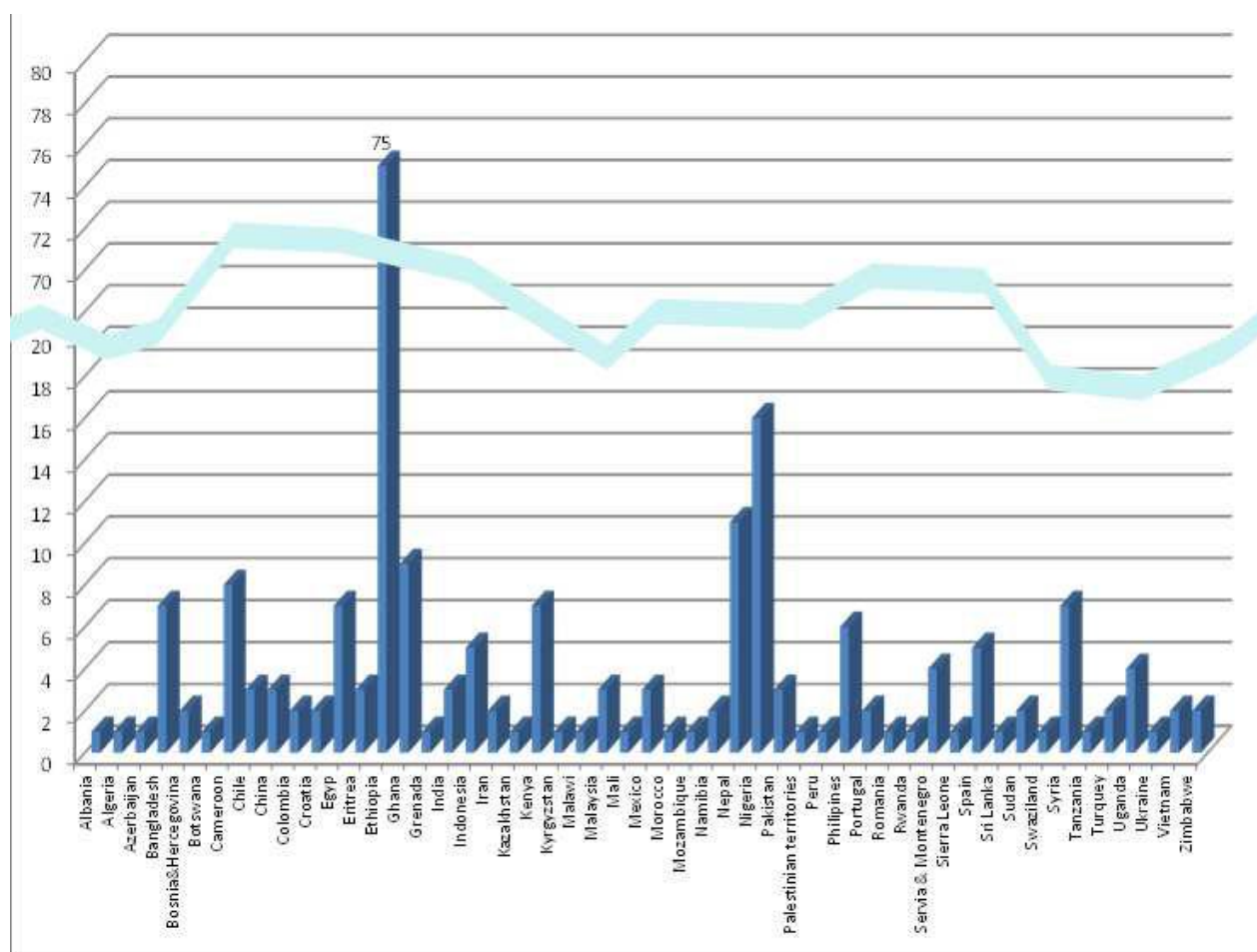


Figure 1: Distribution of the candidates presented to the 2012 Application Call

The number of Erasmus Mundus studentships for EMQAL for the 2013-15 edition is:

- i) 9 of Category A (including the 3 especial windows), and
- ii) 4 of category B.

2. Study Plan

Modules

Because the number of EM studentships for 2013-15 edition is lower than that in previous editions, and the number of possible self-paying students can be affected by the present economic situation, at least in the South of Europe, the offer of modules for the 2013-14 course must be modulated by the expected number of students.

A detailed analysis of the modules offered in previous years, and their contents, has been performed in order to accommodate the number of offered modules to the number of students that can be expected reasonably for next edition. The main objective of this analysis has been to reduce the number of modules without a significant loss of content. After examining the modules contents with some of the lecturers some rearrangements have been done, especially in the Analytical Methods block. This implies some merging, change of contents and the revision of the names and codes of the modules.

Table 2 (in Annexes) lists the names/codes of modules proposed for the 2013-15 edition.

Research Thesis

From 2013-15 edition onwards EMQAL Research Thesis will be expanded to 12 months (60 ECTS), instead of the 6 months valid until now. This feature, together with the new non-EU partners and the Associated Partners incorporated to the consortium, opens a huge range of possibilities for cooperation and joint research projects, always inside the EM mobility rules. This challenge must be managed properly and common research projects must be thought and designed carefully.

Table 3 (in Annexes) lists the research projects proposed for the 2013-15 edition.

Annexes

Table 1: EMQAL Associated partners.

Table 2: Modules for 6th EMQAL Edition (2013-2015) - Host University: UB.

Table 3: Research projects for 6th EMQAL Edition (2013-2015) - Host University: UB.

Table 1. EMQAL Associated Partners.

Type of Institution	Name
University or HE institution	Centro de Química Estructural (CQE), Portugal
3rd-Country universities	Tamil Nadu Agricultural University (TNU), India Universidad Católica del Norte (UCN), Chile
Public research centres (not HE)	Institut de Recerca Hospital del Mar (IMIM), Spain Institut Català de Recerca de l'Aigua (ICRA), Spain Centre de Diagnòstic Biomèdic, Hospital Clínic de Barcelona, Spain
Enterprise large (Public)	Laboratório Central da Empresa Portuguesa das Águas Livres, SA (EPAL), Portugal
Enterprise large (Private)	Sociedad General de Aguas de Barcelona (AGBAR), Spain
Private research centres	Water Technology Center Cetaqua (CETAQUA), Spain
Public authority (national)	Entidad Nacional de Acreditación (ENAC), Spain Norwegian Accreditation (NAA), Norway
Public authority (regional)	Agència de Salut Pública de Barcelona (ASPB), Spain Agencia de Gestión Agraria y Pesquera de Andalucía (AGAPA), Spain Agència Catalana de Seguretat Alimentària (ACSA), Spain Laboratorio Provincial de Salud Pública de Cádiz (LPSPC), Spain
Public HE research centres	Institute of Marine Research (IMR), Norway National Institute of Nutrition and Seafood Research (NIFES), Norway Nofima Biolab (NOFIMA), Norway Norwegian Institute for Air Research (NILU), Norway
Non profit Non governmental organisation Professional associations	Sociedad Española de Química Analítica (SEQA), Spain Sociedade Portuguesa de Química (SPQ), Portugal

Table 2. Modules for 6th EMQAL Edition (2013-2015) - Host University: UB

Quality Management (QM) - 23 MODULES	Lecturer	Lecturer University
QM01 - Quality Management		
QM0101 European Quality Policy and Infrastructures	O. Fernandes	UAlg - Ext
QM0102 Introduction to Quality Management	I. Cavaco	UAlg
QM0104 Laboratory Quality Systems: ISO/IEC 17025	R. Companyó	UB
QM0105 HACCP and ISO 22000	P.Gosálbez/M.Saltor	UB - Ext
QM0106 Good Laboratory Practice	C. Navarro	UB
QM0107 Laboratory Quality Systems: ISO 15189	A. Gomes	UAlg - Ext
QM02 - Management		
QM0202 Human Resources	R. Berger	UB
QM0203 Managing Instalations, Equipment and Consumables	I. Cavaco	UAlg
QM0204 Quality Systems Documentation	R. Vilanova	UB - Ext
QM0207 Laboratory Information Management Systems (LIMS)	R. Ventura et al.	UB
QM0208 Risk assessment	P.Ricci	Ualg
QM03 - Traceability		
QM0302 Calibration and Verification	E.Fuguet/O.Nuñez	UB
QM0306 Proficiency Testing Schemes and Certified Reference Materials	A. Sahuquillo	UB
QM05 - Methods of analysis		
QM0502 Method validation	P. Konieczka	GUT
QM0503 Technical Writing	I. Robinson	UB - EIM
QM0504 Internal Quality Control	R. Companyó	UB
QM06 - Audits		
QM0601 Laboratory Audits (EN ISO 19011)	A. Gomes	UAlg - Ext
QM07 - Safety		
QM0701 Chemical Safety and REACH regulations	X. Guardino	UB - Ext
QM08 - Postgraduate skills		
QM0802 IT Tools	E.Giménez/N.Serrano/A.Tarancon	UB
QM0803 Laboratory Skills	E.Giménez/N.Serrano/A.Tarancon	UB
QM0804 Fieldwork Skills: practical implementation of quality management systems	L.Alvarez / W.Jiménez / F. Centrich/ M.Esteban	UB-HCB(CDB)/ UB
QM0805 Research Skills	E.Fuguet/O.Nuñez	UB
QM0811 Language course - Intensive "survival" Spanish		UB

Data Analysis (DA) - 13 MODULES	Lecturer	Lecturer University
DA01 - Basic Statistics		
DA0101 Measuring variability and Error Propagation	I. Cavaco	UAlg
DA0103 Regression Analysis	W. Chrzanowski	GUT
DA0104 Statistical Decision and Analysis of Variance	M. Rosés	UB
DA02 - Uncertainty measurement		
DA0201 Introduction to Uncertainty Measurement	R. Bettencourt	UAlg - Ext
DA0203 Uncertainty Measurement in Chemical Tests	R. Bettencourt	UAlg - Ext
DA0204 Uncertainty Estimation in Clinical Analysis	A. Gomes	UAlg - Ext
DA03 - Chemometrics		
DA0301 Experimental Design and Optimization	B. Grung	UiB
DA0302 Pattern Recognition and Classification	J.M. Palacios	UCA
DA0306 Fundamentals of Multivariate data analysis	B. Grung	UiB
DA0307 Latent Variable Regression Techniques	B. Grung	UiB
DA0312 Process Analysis: modeling and non-linear parameter fitting	M. Maeder	UNewcastle
DA0313 Multivariate Analysis of Metabonomic and Proteomic Spectral Profiles	O. Kvalheim	UiB
DA0314 Curve Resolution	A. de Juan	UB

Analytical Methods (AM) - 34 MODULES		Lecturer	Lecturer University
AM01 - Natural Water Analysis			
AM0101 Water Directive and CEN Standards	A. Newton		UAlg
AM0102 Water - Sampling and general characterization	B. Zygmunt		GUT
AM0104 Water - Metal Analysis	M.D. Galindo / E. Espada		UCA
AM0105 Water - Analysis of Organic Components	W. Wardencki		GUT
AM0106 Water - Microbiological Analysis	Dept. Microbiologia		UB
AM02 - Food Analysis			
AM0205 Foods – Sample treatment	M. Granados		UB
AM0206 Functional Foods Analysis	M. Palma		UCA
AM0204 Foods - Microbiological analysis	Dept. Microbiologia		UB
AM0210 Determination of toxic substances migration from the packaging to food	S. de Mello Pereira		EM Scholar
AM03 - Clinical Analysis			
AM0301 in Vitro Directive and CEN Standards	A. Gomes		UAlg-Extern
AM0307 Medical Microbiology	J.Vila / J. González		UB-HCB(CDB)
AM0309 Fundamentals of Biochemical Analysis	S.Imperial / E.Estébanez		UB
AM0314 Chemical fingerprinting and quality control of herbal medicines	Y.Liang		CSU
AM05 - Environmental Analysis			
AM0501 Trace Metal Water Speciation	J.P. Pinheiro		UAlg
AM0502 Atmospheric Analysis	W. Wardencki		GUT
AM0503 Soil and Sediment Analysis	M.Vidal		UB
AM0507 Environmental samples monitoring	V. Kokovkin		NSU
AM07 - Biochemical Analysis			
AM0701 Immunoassays	P. Marco		UB-Ext
AM08 -Sampling			
AM0801 Design of Sample Strategies and sampling techniques	A. de Juan		UB
AM09 - Advanced Techniques of Analysis			
AM0907 Molecular Spectroscopy	E.Giménez/N.Serrano/A.Tarancon		UB
AM0908 Vibrational Spectroscopy	E. Nodland		UiB
AM0909 Quantitative IR Spectroscopy	M. Palma		UCA
AM0910 Atomic Spectroscopy	J.F.López / A. Sahuquillo		UB
AM0912 Mass spectrometry	E. Moyano		UB
AM0913 Hyphenated techniques	E. Moyano		UB
AM0914 Electroanalytical techniques	C.Ariño / J.M.Díaz		UB
AM0918 Automated methods of analysis	X.Saurina		UB
AM0919 Gas Chromatography	X.Santos		UB
AM0920 Liquid Chromatography	E. Moyano		UB
AM0923 Extraction Methods in Analytical Chemistry	E. Durán		UCA
AM0925 Quality Parameters and Optimization in Chromatography	S. Mjos		UiB
AM0926 Application of Nanomaterials in the Analytical Laboratory	J.M.Palacios		UCA
AM0927 The practice of Capillary Electrophoresis: optimization and method development	M.F.M. Tavares		USP
AM0928 Green Analytical Chemistry	M.D. Galindo / E. Espada		UCA

Table 3. Research projects for 6th EMQAL Edition (2013-2015) - Host University: UB

Nº.	University	Name/s of Supervisor/s	Title of the research master thesis project
1	UAlg	M.C. Mateus	LC-MS/MS validation methods for analysis of planktonic biotoxins - eg mycrocistins, cylindropsemodin or saxitoxins - in water or sediments
2	UAlg	M.C. Mateus	GC/MS validation method for analysis of Chlorinated hydrocarbons in underground water.
3	UAlg	A. R. Garcia / I. Cavaco	DRIFT and DR-UV/vis spectroscopy methods for studying the interaction of vanadium compounds with cellulose.
4	UAlg / CSU (China)	L.Barreira, J.Icely, I. Cavaco / Y. Liang	Chromatographic Analysis and Comparison of the Chemical Composition of Samples of mussels in Europe and China. <i>Note: this thesis will involve three months of study in China. European students may receive an additional grant of 3000 euros for this thesis. Non-European students may not receive any additional grant. Chinese students are not allowed to choose this thesis.</i>
5	UAlg/CQE	J. Costa Pessoa, I. Cavaco	Metal Complexes as therapeutic drugs. Evaluation of their transport in blood, uptake and action by applying a set of analytical/spectroscopic techniques. <i>Note: two different thesis will be available within this subject. Projects done in Collaboration with Centro de Química Estrutural (CQE).</i>
6	UAlg / EPAL	V. Cardoso (EPAL) / I. Cavaco	Analysis of organic contaminants in water intended for human consumption – analysis by GC-TOFMS with different sample preparation techniques (LLE, SPE and SPME). <i>Note: two different thesis will be available within this subject. Projects done in collaboration with Empresa Pública de Águas de Lisboa (EPAL).</i>
7	UAlg	A. R. Garcia	Validation of a FTIR method for characterization of solid samples
8	UAlg	V. Marques	Pharmacogenetic analysis of drug metabolizing enzymes and transporters
9	UAlg / UB	J. Pinheiro / C. Ariño or N. Serrano	Antimony film electrode as an alternative to bismuth in the replacement of mercury as electrode material. <i>Note: The thesis will be defended in UAlg.</i>
10	UAlg / UCA	J. Pinheiro / J. M. Palacios	Trace metals speciation in seawater by SCP/SSCP and AGNES using different carbon nanotubes-modified electrodes.
11	UAlg / UNESP Sorocaba (Brasil) (If accepted as AP)	J. Pinheiro / A.Rosa	Comparison of Lead and cadmium ions interaction with purified peat humic matter studied by SSCP/AGNES and ultrafiltration/ICP-OES. <i>The electrochemical work will be performed in UAlg and the ultrafiltration/ICP-OES in Sorocaba, Brasil</i>
12	UAlg / GUT	L. Dionisio, M.C.Mateus, A.R. Garcia, J. Pinheiro or I. Cavaco / P. Konieczka	Interlaboratory Comparisons in the analysis of new reference materials.
13	UAlg	A.R. Garcia, L. Barreira, I. Cavaco	Development of an alternative method for the characterization of fibers in algae by FTIR and DRIFT.
14	UiB / Inst. Marine Research	B.Grung, E.Nodland /S.Meier (IMR)	Raman spectroscopy studies of polychlorinated biphenyls (PCBs) effects on phospholipid liposomes.
15	UiB / UCA	B.Grung / E. Durán	Development of extraction methods for the analysis of chemical composition from the different parts of citrus fruits.
16	UiB / UCA	B.Grung / E. Durán	Analytical study of the compounds from different woods employed in the ageing of wines.
17	UiB / Bergen College of Engineering	B. Grung / O. Kvammen	An investigation of the chemistry involved in adding water to whisky.
18	UiB	S. A. Mjøs	Optimization of chromatography and mass spectrometry using experimental design and chemometrics.
19	UiB	B.Grung, H-R. Bjørsvik	Process monitoring of continuous flow organic syntheses using on-line fibre optical spectroscopy.
20	UiB	B.Grung, S. A. Mjøs	The use of vibrational spectroscopy to quantify the fatty acid content in dietary supplements.
21	NIFES / UiB	P. Araujo / B.Grung	Impact of omega 3 and omega 6 polyunsaturated fatty acids on the production of cyclo- and lipo- oxygenase mediated metabolites in fish cell culture experiments.
22	GUT / UCA	W. Wardencki/M. Palma	Comparison of new methods for determination of phenolics in vegetables.
23	GUT / UCA	W. Wardencki/M. Palma	New analytical methods for bioactive components in foods.
24	GUT	A. Wasik	Studies on the usability of selected volatile LC-MS buffer systems
25	GUT	A. Wasik	Food additives analysis
26	GUT	A. Wasik	Bisphenol A and Bisphenol S in human diet - exposure measurement by HPLC-MS/MS
27	GUT	A-K Wasik	Analysis of isoprostanes in EBC and human blood using HPLC-MS/MS
28	GUT	A-K Wasik	HILIC as an alternative solution for RPLC for very polar analytes
29	GUT	A-K Wasik	HPLC aminoacids analysis with and without derivatisation
30	GUT	A. Wasik	Hormone residue in water samples
31	GUT	A-K. Wasik	LC-QTOF for pharmaceuticals and their degradation product identification and quantitation
32	GUT	P.Konieczka	Production of new Certified Reference Materials for environmental analytics
33	GUT	W.Wardencki	Determination of selected antioxidants and amino acids in potential superfruits and fruit-based products by on-line combination of capillary isotachopheresis and capillary zone electrophoresis (cITP-CZE).
34	GUT	W.Wardencki	Development of analytical procedure for determination of markers of chronic kidney disease in exhaled human breath by comprehensive two-dimensional gas chromatography in combination with time-of-flight mass spectrometry (GC x GC-TOFMS)
35	GUT	W.Wardencki	Elaboration of procedure for determination of volatiles in edible oils using headspace solid-phase microextraction (HS-SPME) and comprehensive two-dimensional gas chromatography coupled with time-of-flight mass spectrometry (GC x GC-TOFMS).
36	GUT	W.Wardencki	Determination of volatile compounds in edible oils on different degree of spoilage using headspace solid-phase microextraction (HS-SPME) and comprehensive two-dimensional gas chromatography coupled with time-of-flight mass spectrometry (GC x GC-TOFMS).
37	GUT	B.Zabiegała	Understanding the processes describing occurrence and fate of constituents of personal care products residues in the environment