The Faculty of Chemistry

http://www.ub.edu/quimica
Faculty of Chemistry

- Teaching
- Research
- Technology Transfer

Universitat de Barcelona

B:KC Barcelona Knowledge Campus
Campus of International Excellence
The Faculty of Chemistry

Bachelors:

Chemistry 240 ECTS (4 years)

Chemical Engineering 240 ECTS (4 years)

Materials Engineering 240 ECTS (4 years)
The Faculty of Chemistry

Masters:

*Electrochemistry. Science and technology
*Environmental Engineering
*Chemical Engineering
*Analytical Chemistry
*Applied Materials Chemistry
*Organic Chemistry
*Theoretical Chemistry and Computational Modelling
The Faculty of Chemistry

• Master in Erasmus Mundus Master in Quality in Analytical Laboratories.

• Master in Erasmus Mundus in Chemical Innovation and Regulation.
Erasmus Mundus Master in

Chemical Innovation and Regulation

Where will I study?

University of Algarve (Portugal)
University of Barcelona (Spain)
University of Bologna (Italy)
Heriot Watt University (UK)

Why choose the EMMC-ChIR?

Get a highly valued Joint Master Degree recognized in several European Countries
Study with the best experts in the field
Very flexible: build your own study plan
Study in a truly international environment
Work with other students from all countries of the world
Study in at least two different countries
Improve your English and learn new languages
Classes in English
You can apply for an Erasmus Mundus studentship

Deadline for applications to EM Studentships: December 31, 2013

Dr Daniel Sainz
daniel.sainz@ub.edu

Teaching

More information:
Dr Daniel Sainz
daniel.sainz@ub.edu

www.emmcChIR.org

Am I eligible?

Candidates must hold a 1st cycle degree (bachelor) with a good background of Chemistry and be proficient in English.

Applications are submitted online.

Looking for more information?

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Looking for more information?
**Erasmus Mundus Master in Quality in Analytical Laboratories**

**Why this Master?**
Because analytical laboratories play a crucial role in modern societies:
- Analysis of food and drinking water affect the health of whole populations;
- Medical decisions depend on the results of clinical analyses;
- Environmental assessment is performed through chemical analysis, which is decisive for pollution control;
- Even court trials are more and more dependent on the result of forensic analysis;
- The economic value of goods, like metal ores and oil, is decided based on chemical analysis, and in this way the reliability of the analyses performed affects not only local trade, but also the world economy.

Nowadays, laboratories are required to adopt quality systems conforming to international standards, in order to assure that results are reliable and comparable worldwide.

EMQAL prepares professionals for analytical laboratories, focusing on laboratory management and quality systems, along with complementing their technical knowledge.

With the support of Erasmus Mundus programme of the European Union

**How is it structured?**
The programme lasts 24 months (120 ECTS): one year of classes (60 ECTS), which takes place in the host university, and one year of research project and thesis, in another European university of a different country. This project can be partially done in one of the non-EU universities and/or one of the non-EU associate partner institutions.

The course is designed so that students acquire the three general skills essential for managing a laboratory: technical, managing and statistical skills. Lectures are organised in three disciplines:

- Analytical Methods
- Quality Management
- Data Analysis

All classes are optional. Students take 30 modules and must fulfill a minimum of 5 modules from each discipline. According to his/her background, each student can choose from a wide range of options fitting his/her professional and personal interests, namely in water analysis, food analysis or clinical analysis.

**Where will you study?**
The host university rotates every year among:
- University of Algarve
- University of Barcelona
- University of Cadiz
- University of Bergen
- Galinusk University of Technology

Selected students may take part of their research thesis in:
- Central South University (China)
- University of São Paulo (Brazil)
- Novosibirsk National Research State University (Russia)
- An associate partner of the consortium.

**Who can apply?**
The main requirements for admission are:
1) A strong academic background in appropriate disciplines such as Chemical and Biochemical Sciences, Biological Sciences, Health Sciences, Food Sciences or Environmental Sciences.
2) Demonstrated command of the English language.

**Studentships**
The European Commission provides a limited number of grants per year according to the Erasmus Mundus rules.

**Online Applications:**
http://www.emqal.org
Participation in other Masters.

- Water. Interdisciplinary Analysis and Sustainable Management
- Biotechnology
- Energy Engineering
- Nanoscience and Nanotechnology
- Food Safety
Doctoral Programs

- Materials Science and Technology
- Electrochemistry. Science and Technology
- Environmental Analytical Chemistry
- Molecular Inorganic Chemistry
- Organic Chemistry
- Theoretical and Computational Chemistry
Faculty of Chemistry

32 excellents groups

Matter and Materials

Chemistry and life bio-actives molecules

Environmental Analysis, Control and Decontamination
Research: new materials and the improvement of existing ones.

From the atoms and molecules through big structures
New materials:

Investigation propose models and design new materials

Nanomaterials: Studied reactions and processes that produce nanoparticles or micro and macro structure with nano particles (nanostructured) or structures with controlled porosity for application in food technology or biomaterials.

Research in thermoelectric materials in the most efficient materials for energy storage, solid oxide fuel cells, superconductors of high critical currents, magnetoresistive materials, polymers or fireproof for catalysts in the production of alternative fuels such as hydrogen or ethanol and catalytic activation of CO2.
Improvement of materials

Modification of the chemical composition of a material that can better respond to some requests more severe and complex type of chemical, physical or mechanical, environmental or regulatory.

How using new or modified processes cause changes in the structure of some materials and therefore changes in their properties.

Reduce the environmental impact and inert waste, the design and optimization of processes for recycling of products and improving the efficiency of industrial processes in which materials are involved.
Research groups

- Bioelectrochemistry and Nanotechnology (QF) SGR
- Biofisicoquímica macromolecules and colloids (QF)
- Science and technology of thermal spraying (CMiEM) SGR
- Design and optimization of processes and materials (CMiEM) SGR
- Computational Materials Science Laboratory (QF)
- Colloidal systems engineering (EQ)
- Molecular structure of materials (QF) SGR
- Characterization of materials and processes in science (CMiEM)
- Laboratory corrosion and electrodeposition (QF)
- Electrochemical Materials Laboratory and the environment (QF) SGR
- Catalytic materials (QI)
- Organic materials (QO)
- Nanotechnology: engineering of complex structures for applications nanobiologiques design and supramolecular structures (EQ)
- Solid State Chemistry (IQ)
- Chirality in complex chemical systems (QO)
- Self Organized complexity and self-assembled materials (QF) SGR
Faculty of Chemistry

32 excellents groups

Matter and Materials

Chemistry and life bio-actives molecules

Environmental Analysis, Control and Decontamination
AOP (advance oxidation processes).
- **Biological waste water treatment** (nitrification, denitrification, organic matter removal, membrane bioreactors, granular bioreactors,..)

- **Oxidative waste water treatment** (ozone, electrooxidation, ozone/UV, UV/H2O2, UV/Fe/H2O2, photocatalysis...)

- Use of **membrane techniques** (microfiltration, ultrafiltration, nanofiltration, reverse osmosis) for the waste treatment

- **Anaerobic digestion** for solid and liquid organic wastes with high organic load

- **Analysis and Control** of contaminants in air and water

- **Transformation and Fate** of contaminants in the environment

- **Metals recovery** from wastes

- **Desalinization and water reuse** (biofouling, micropollutants, desinfection.)
**Research groups:**

- Bioanalysis *(QA)* SGR
- Environmental Biotechnology *(EQ)*
- Composting *(EQ)*
- Chromatography, capillary electrophoresis and mass spectrometry *(QA)*
- Determination and behavior of inorganic contaminants and radionuclides in the environment *(QA)*
- Electroanalysis *(QA)*
- Equilibria and chemometrics *(QA)*
- Engineering of advanced oxidation processes *(EQ)* SGR
- Element speciation of trace biological and environmental samples *(QA)*
- Spectroscopy and liquid chromatography: analysis of pollutants *(QA)*
- Chemistry in solution: solute-solvent *(QA)*
- Industrial separation processes *(EQ)*
Faculty of Chemistry

32 excellents groups

Matter and Materials

Chemistry and life bio-actives molecules

Environmental Analysis, Control and Decontamination

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Campus of International Excellence
Bioactive molecules

• Bioactive molecules to examine the reactivity of synthesizing those that are scarce in nature or designing their analogs may become drug agonists or antagonists (drugs).
• Study of the structure, synthesis and applications of nucleic acids and other amino acids and nucleoside chemistry.
Bioactive molecules

- modeling biological systems with pharmaceutical and biochemistry research groups
- additives and contaminants in food with analytical chemistry groups
- Development of palladium composites in inorganic chemistry research groups.
Research groups:

- Amplification of chirality transfer (QO)
- Design and synthesis of new antibiotics and anticancer peptide (QO)
- Homogeneous Catalysis (QI)
- Dendrimers and molecular polygons (QI)
- Structure of peptides and proteins (QO)
- Methodology and synthesis of natural products (QO)
- Modeling biological systems and drug design (QF)
- Bioinorganic (QI)
- Chemical bioorganometàl metal (QI)
- Chemistry of amino acids and nucleosides (QO)
- Industrial and Applied Organic Chemistry (QO)
- Asymmetric synthesis research (QO)
- Biomolecular NMR: structure and dynamics of proteins and protein complexes (QO)
- Synthesis and applications of composite ciclometal installed (QI)
- Stereoselective synthesis of antitumor and antiviral (QO)
- Stereoselective synthesis of bioactive natural products (QO)
- Synthesis, structure and applications of nucleic acids (QO)
Results of research of the Faculty of Chemistry (2005-2010)

- Journal publications: 2854
- Theses and research projects: 675
- Patents: 42
- Contributions to congresses: 2578
- Publications in books: 349
Budget: National and European Projects

9,2 Millions Euros (2010-2012)

Budget: From contracts and research agreements 1,3 Millions Euros (2010-2012)
TECNIO is the umbrella brand for Catalan technology centres and university research groups dedicated to industrial research and technology transfer.

TECNIO is a synonym for cutting-edge technology, business innovation and management excellence.
Center for Innovation and Advanced Technologies at University of Barcelona (CITA-UB)

CITA-UB technology agents

The CITA-UB is formed by the following experts UB groups of research that they have been recognized with the TECNIO brand by the Catalan Government through its agency ACETI.

CCITUB:
University of Barcelona Scientific and Technologic Centers

CELLTEC:
Cellular and Molecular Technology Research Center

CEMIC:
Micro-Nanosystems for Instrumentation and Communications Engineering Center

CEOAP:
Center for Environmental and Product Chemical Engineering

CERETOX:
Centre of Research in Toxicology

CPT:
Thermal Spray Center

DIOPMA:
Center for Design and Optimization of Processes and Materials

ELECTRODEP:
Electrodeposition and Corrosion Laboratory

SDM:
Service of Medicines Development

SINTERFARMA:
Centre for Research and Development in Organic Synthesis for the Pharmaceutical Chemical Industry

UOGC:
Combinatory Chemistry Unit
Center for Innovation and Advanced Technologies at University of Barcelona (CITA-UB)

The meeting point between the research groups in the UB Group and companies interested in carrying out R & D & I projects.

AREAS OF EXPERTISE

- **FOOD: TECHNOLOGY, SAFETY AND QUALITY**
- **SUSTAINABLE DEVELOPMENT: ENVIRONMENT, ENERGY AND WATER**
- **INDUSTRIAL PROCESSES**
- **INFORMATION, COMMUNICATION AND KNOWLEDGE TECHNOLOGIES**
- **HEALTH AND QUALITY OF LIFE**

**CITA-UB in figures:**

- More than 80 researchers
- 555 research projects and services (2005-2010)
- 83 competitive projects with public funding (33 international and 50 Spanish)
- More than 200 patent applications
Center for Innovation and Advanced Technologies at University of Barcelona (CITA-UB)

Services we offer in the expertise areas:

- Design and execution of R+D+I projects
- Prototyping
- Product engineering
- Improvement of production processes
- Software development
- Validations and pre-certifications
- Laboratory tests
- Physicochemical analysis
- Technical advice and consultancy
- Opinions and reports
- Market studies
- Personnel training

External advisory committee
## CONTRACT RESULTS

### 2012

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<th>Gestió de Programes i Serveis</th>
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### Empreses

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### Administracions i Institucions

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Ranking.

QS World University Rankings
Position of the UB in the ranking

El QS (Quacquarelli Symonds) World University Rankings classifies the top 500 universities worldwide. In the last report included ten Spanish universities, UB was the first, in the 187th position.

Annual reports of the journal "El Mundo" about 50 careers (2001-13). The Faculty of Chemistry is the first recommended Centre to study Chemistry in Spain in the last nine consecutive years. It has been the first one in twelve of the thirteen twelve annual reports.
Thank you for your attention.

http://www.ub.edu/quimica