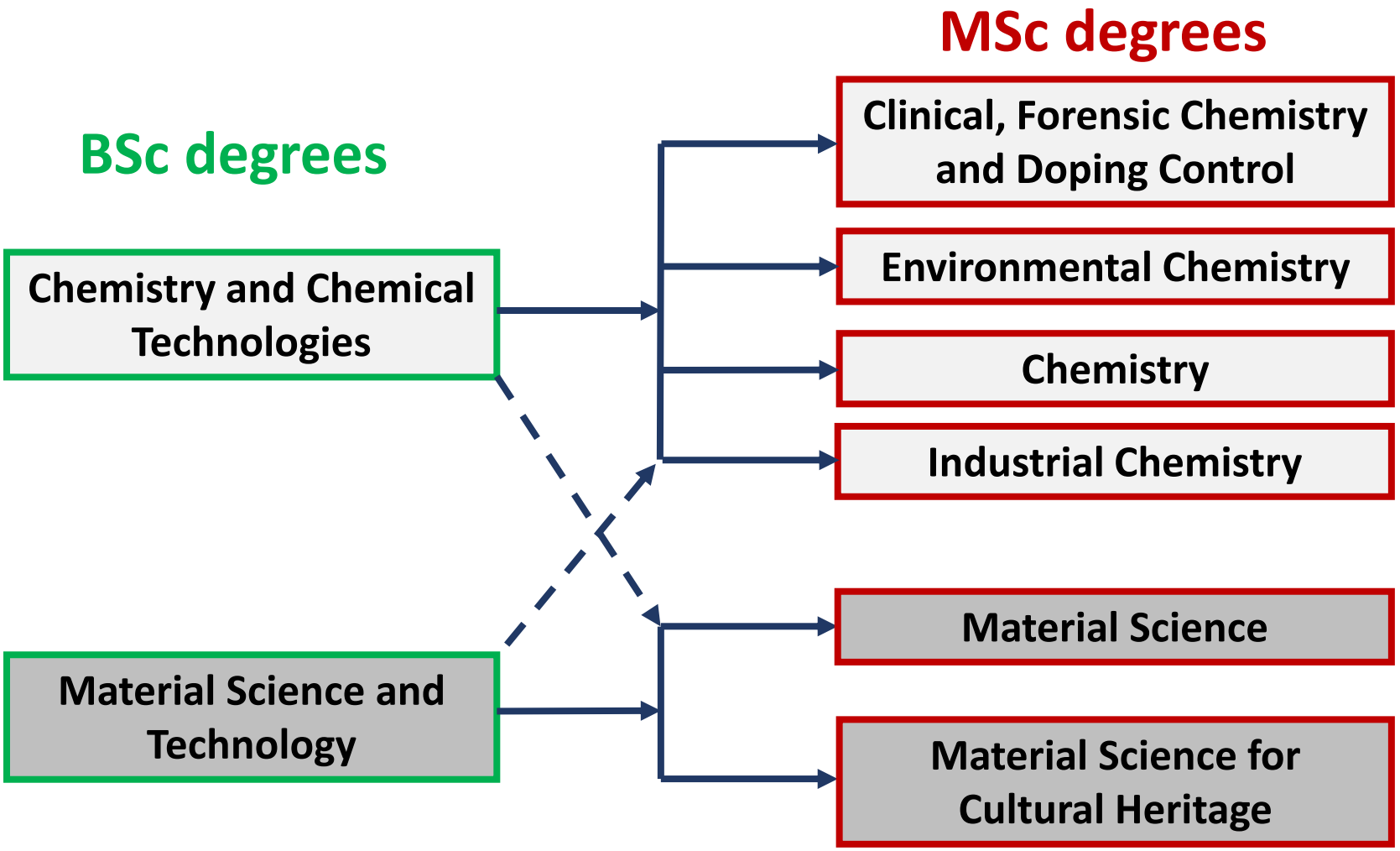
Education degrees @ Department of Chemistry (2016)



European Credit Transfer and Accumulation System

	Lectures	Class Workshops	Laboratory	Internship/ Thesis
1 ECTS	8 h	12 h	16 h	25 h

CHEMISTRY AND CHEMICAL TECHNOLOGIES 180 ECTS

The Bachelor 's degree in Chemistry and Chemical Technologies is an educational path aimed at providing basic chemical notions, essential pre-requisites for laboratory activities, namely synthesis or analyses, and industrial production. The courses cover the foundations of inorganic, organic, physical, analytical and biological chemistry, and also provide students with the basic concepts of environmental chemistry, sustainable development, "green chemistry" and new EU legislation on classification and risk assessment of chemicals.

first and second year (58+64 ECTS):

	ECTS
Mathematics	16
Physics	10
Inorganic Chemistry	24
Organic Chemistry	22
Physical Chemistry	32
Analytical Chemistry	12
Biochemistry	6
Chemistry of Metals and Polymers	8

Lab activities (tot.): **5** ECTS
Class Whorkshops (tot.): **10** ECTS
English: **2** ECTS

third year (58 ECTS):

CHEMISTRY Curriculum	ECTS
Analytical Chemistry	16
Inorganic Chemistry	4
Organic Chemistry	6
Physical Chemistry	6
Related and supplementary subjects	8
Optional subjects	12

Lab activities (tot.): **13** ECTS
Class Whorkshops (tot.): **1** ECTS
English: **2** ECTS

INDUSTRIAL CHEMISTRY Curriculum	ECTS
Analytical Chemistry	10
Inorganic Chemistry	3
Organic Chemistry	5
Industrial Chemistry	17
Related and supplementary subjects	6
Optional subjects	12

Lab activities (tot.): **12** ECTS
Class Whorkshops (tot.): **8** ECTS
Safety: **1** ECTS

Final dissertation: 4 ECTS

http://chimicaetecnologie.campusnet.unito.it

MATERIALS SCIENCE AND TECHNOLOGY

180 ECTS

The Bachelor's degree in Material Science and Technology aims to prepare experts in the fields of synthesis, process technologies and use/development of techniques for material characterization. The degree course is intended to meet the specific requirements of the productive, service and research sectors in different fields such as catalysis, polymers, metals and alloys, glasses and ceramics, biomaterials, energy production, sensors, microelectronics, diagnostics of historical and artistic crafts, and preservation of cultural heritage.

First and Second year (61+63 ECTS):

Mathematics	**20**
Physics	**30**
Inorganic Chemistry	**10**
Organic Chemistry	**10**
Physical Chemistry	**14**
Analytical Chemistry	**8**
Material Chemistry	**22**
Crystallography	**64**

Lab. activities (tot.): **12** ECTS
Class Workshops (tot.): **6** ECTS
English: **4** ECTS

Third year (56 ECTS):

Materials for Cultural Heritage Curriculum	ECTS
Chemistry for Cultural Heritage	**8**
Diagnostic Physics	**6**
Mineralogy	**6**
Plant Biology Applied to Cultural Heritage	**12**
Petrography	**6**
Optionals	**12**

Lab. Activities (tot.): **1** CFU
Class Workshops (tot.): **1** CFU
Use of Computers: **2** CFU

Materials for Industry Curriculum	ECTS
Physical Chemistry of Materials	**6**
Spectroscopy and Microscopy methods	**6**
Materials for Energy	**6**
Mathematical Methods and Quantum Mechanics	**8**
Materials for electronics	**12**
Optionals	**12**

Lab. Activities (tot.): **7** CFU
Class Workshops (tot.): **1** CFU
Use of Computers: **2** CFU

Final dissertation: 4 ECTS

http://stmateriali.campusnet.unito.it

CLINICAL, FORENSIC CHEMISTRY AND DOPING CONTROL

120 ECTS

The Master's degree in Clinical, Forensic Chemistry and Doping Control aims to train graduates who have an excellent basic preparation in chemistry, cell biology and biochemistry, in addition to competences in the scientific method of investigation. The Clinical, Forensic Chemistry and Doping Control graduate carries out chemical research and analyses in order to reveal the presence, nature and composition of chemical substances (doping, drugs, medicines) used by people or detected on evidence. His/her activity is also devoted to identify new methods, techniques and tools for chemical investigation and for the validation of results.

first year (61 ECTS):

	ECTS
Analytical Chemistry (Instrumental and Chemometrics; Clinical & Forensic)	18
Physical-Chemical Methods for Clinical and Forensic Investigations	16
Biochemical Methods	5
Medicinal Chemistry (Doping Agents and Drugs of Abuse)	9
Macromolecular Chemistry and combustion processes	6
Molecular Genetics	4
Introduction to Criminal Law Procedure and Forensic Toxicology	6
Crime Scene Investigation and Introduction to Forensic Pathology	4

Lab activities(tot.): **4** ECTS

Class Workshops (tot.): **1** ECTS

second year (22 ECTS):

	ECTS
Crime Scene Investigation and Introduction to Forensic Pathology	4
Analytical Chemistry (Analytical Toxicology and Doping Control)	10
Inorganic Chemistry (Magnetic resonance spectroscopy and X-ray diffraction in clinical and forensic chemistry)	8

Lab activities (tot.): **2** ECTS

Training activities over the two-year degree (37 ECTS):

Optional	**8 ECTS**
Internship	**3 ECTS**
Final dissertation	**26 ECTS**

http://ccfs.campusnet.unito.it

ENVIRONMENTAL CHEMISTRY

120 ECTS

The Master 's degree in Environmental Chemistry aims to provide students with the basic concepts of environmental chemistry and physics , natural and anthropogenic interactional dynamics, and current regulations on the subject. The graduate will acquire knowledge in the design and management of environmental protection technologies, environmental control laboratories, environmental security and control techniques, and environmentally friendly technologies.

first year (60 ECTS):

	ECTS
Environmental Chemistry	6
Atmospheric Physics	6
Environmental Organic Chemistry	6
Physical Chemistry (Environmental chemodynamics; Structural and surface investigation)	14
Analytical Chemistry (Analytical chemistry of pollutants; Aquatic chemistry)	18
Inorganic Chemistry (Inorganic analysis and electrochemistry)	10

Lab activities (tot.): **10** ECTS

Class Workshops (tot.): **2** ECTS

second year (18 ECTS):

	ECTS
Environmental chemical toxicology	6
Environmental modelling and certification	6
Chemical management of wastes	6

Training activities over the two-year degree (42 ECTS):

Optional	**12 ECTS**
Internship	**4 ECTS**
Final Dissertation	**26 ECTS**

http://chimicaambiente.campusnet.unito.it

CHEMISTRY 120 ECTS

The Master's degree in Chemistry seeks to consolidate the basics of Chemical disciplines, allowing students to acquire competences for carrying out activities in the fields of scientific and technological innovation. The graduate will be able to work in laboratories, public and private companies, especially in the research and development sectors, where innovation is mostly needed, even at the management level.

Compulsory Subjects	ECTS
Functional and Structural Biochemistry	6
Synthesis and mechanisms in organic chemistry	8
Magnetic Resonance	6
Catalysis	6

tot.: 26 ECTS

Characterizing optional subjects (5) - 6 ECTS each -

Inorganic Chemistry	Physical Chemistry	Organic Chemistry	Industrial Chemistry	Analytical Chemistry
- Bioinorganic chemistry; - Metal complexes; - Inorganic Synthesis;	-Structural Chemistry; -Solid State Chemistry; -Computational Chemistry;	- New Trends in Organic Chemistry; - Molecular Modeling	Polymeric Materials	- Analytical Strategies; - Chemometrics;
a choice of 2		**a choice of 1**	**1**	**a choice of 1**

tot.: 30 ECTS

Optional (5)	
Releted subjects (6 ECTS)	**Elective Subjects (4 ECTS)**
- Agricultural Chemistry; - Synthesis and Development Methodologies; - European Projects, Innovation and Intellectual Property Law;	- Identification of organic compounds; - Applied Eletrocatalysis; -Solid State Modeling ad Simulaton; -Radiochemistry
a choice of 2	**a choice of 3**

tot.: 24 ECTS

Internship	**4 ECTS**
Final dissertation	**36 ECTS**

http://lmchimica.campusnet.unito.it

INDUSTRIAL CHEMISTRY 120 ECTS

The Master's degree in Industrial Chemistry aims to spread knowledge in various disciplines, such as the optimization of industrial products, materials and processes in accordance with environmental and safety requirements. In particular, subjects deal with the following areas of expertise: the main industrial processes in the fields of organic/inorganic chemistry and materials; plants; analysis and characterization of industrial products; polymeric and metallic materials. In addition, the graduate will acquire the basics of business management.

first year (51 ECTS):

	ECTS
Analytical Control of Products and Industrial Processes	9
Advanced Inorganic Chemistry	9
Physico-Chemical Methods for the Industrial Chemistry	9
Industrial Chemistry	9
Applied Organic Chemistry	9
Chemical Reactors	6

Lab activities (tot.): **11** ECTS
Class Workshops (tot.): **3** ECTS

second year (24 ECTS):

	ECTS
Metallurgy	9
Chemistry of Polymeric Materials	9
Economics	6

Lab activities (tot.): **4** ECTS
Class Workshops (tot.): **1** ECTS

Training activities over the two-year degree (45 ECTS):

Optional	**8 ECTS**
Internship	**7 ECTS**
Final dissertation	**30 ECTS**

http://chimicaindustriale.campusnet.unito.it

MATERIALS SCIENCE FOR CULTURAL HERITAGE 120 ECTS

The Master's degree in Material Science for Cultural Heritage aims to train experts in cultural heritage, combining a solid background in technical and scientific disciplines with an in-depth knowledge of materials which may be of interest for the historical, artistic, archaeological and restoration contexts. The final goal is to provide students with specialized skills for the characterization of properties, degradation and manufacturing techniques of historical materials, in addition to their production and development. With special reference to cultural heritage, the intervention methods and diagnostic procedures will be analyzed. The graduate will be able to participate in the planning, implementation and monitoring phases of the diagnostics, conservation and restoration of cultural heritage.

first year (58 ECTS):

	ECTS
Pictorial materials for Cultural Heritage	6
Environmental Physics	6
Polymers for the Conservation	8
Metallic Materials for Cultural Heritage	6
Physical and Chemical Diagnosis	12
Mineralogy Applied to Cultural Heritage	8
Botanical Methodologies Applied to Cultural Heritage	6
Petrography Applied to Cultural Heritage	6

Lab activities (tot.): **6** ECTS

second year (20 ECTS):

	ECTS
Dating And Archaeomagnetic Dating And Archaeomagnetic Applications for the Rescue of Cultural Heritage	8
Mechanics of Materials and Historic Structures	6
Antropology for Cultural Heritage	6

Lab activities (tot.): **3** CFU

Training activities over the two-year degree (42 ECTS):

Optional	**12 ECTS**
Internship	**2 ECTS**
Final dissertation	**28 ECTS**

http://smbeniculturali.campusnet.unito.it

MATERIALS SCIENCE 120 ECTS

The Master's degree in Material Science addresses the needs of the manufacturing and service sectors. The course aims to provide students with advanced and integrated training across the following areas: chemistry and physics of solids, material production technology, instrumental characterization and modeling of material structures and properties. Subjects deal with the impact of materials on the environment, industry and economy; internship at public or private structures is highly recommended. Permanent contacts with local institutions, industries and service providers are established in order to guide post-graduates. The subjects are taught in English.

first year (64 ECTS):	ECTS
Advanced mathematics and numerical analysis	8
Physics (Quantum Mechanics; Solid State Physics)	18
Polymeric Materials	8
Advanced Crystallography	6
Physical Chemistry	8
Analytical Chemistry for Material Science	4
Solid State Chemistry	6
Metallurgy	6

Lab activities (tot.): **8** ECTS

second year (12 ECTS):	ECTS
Organic Materials	6
Selection and use of materials	6

Lab activities (tot.): **4** ECTS

Training activities over the two-year degree (44 ECTS):

Optional	**8 ECTS**
Internship	**16 ECTS**
Final dissertation	**20 ECTS**

http://scienzadeimateriali.campusnet.unito.it

MaMaSELF in MATERIALS SCIENCE — 120 ECTS

The MaMaSELF Master's degree in Materials Science operates in the frame of the European Erasmus Mundus platform in collaboration with the French (Rennes-1 and Montpellier-2) and German (TUM and LMU) Universities. Student mobility is a requirement: in the second year students will be enrolled in a different university (of a different country) with respect to the first year. The emphasis of the master is on the use of *Large Scale Facilities* (synchrothron and neutron sources) representing the frontier in materials characterization. Two (or three) Master Diploma will be granted at the end of the 2-year cycle. Grants form EU are available.

first year (60 ECTS):

	ECTS
Advanced mathematics and numerical analysis	8
Physics (Quantum Mechanics; Solid State Physics)	14
Polymeric Materials	8
Advanced Crystallography	6
Physical Chemistry	8
Analytical Chemistry for Material Science	4
Solid State Chemistry	6
Metallurgy	6

Lab activities (tot.): **8** ECTS

second year, first semester (30 ECTS):

	ECTS
Selection and use of materials	6
Organic materials with laboratory	6
Large scale facilities for materials science (Summer School in Montpellier)	7
Complements of crystallography	5
Computational aspects in materials science	3
Industrial applications of materials science	3

Lab activities (tot.): **4** ECTS

second year, second semester (30 ECTS):

Master thesis and Final dissertation	**30 ECTS**

http://www.mamaself.eu/

http://scienzadeimateriali.campusnet.unito.it

MaMaSELF in MATERIALS SCIENCE

Application deadline: during the 3rd year of Bachelor's degree (end of January).

Admission criteria: - Bachelor (180 ECTS) in Materials Science or related disciplines (Chemistry, Physics,…).
- Proof of good English competencies, (TOEFL CBT 230 and PBT 550 IBT 80 / IELTS 6.5 or equivalent) except for applicants native from english speaking countries

Selection

Category A

Accepted with Erasmus Mundus fellowship (18.000 euros x 2 years). Mobility is required.

Category B

Accepted without Erasmus Mundus fellowship. The student can be applied for other Erasmus fellowship

Category C

Not accepted at MaMaSELF (admission to the Master's degree in Materials Science is not precluded)

SCENARIO

SCENARIO

The student will stay one year in one institution and a second in another institution. It is not possible to stay the two years at the same site. 2nd year will be split in two semesters : the first one at a university, the second one is (Master thesis project) can be conducted at another university or at Large Scale Facilities.

2 or 3 degrees

Example for italian student:
1° year in France.
2°year in Italy or Germany; as an alternative 1° semester Italy and master thesis in Germany (or vice versa)

Example for italian student:
1° year in Italy.
2°year : 1° semester Italy and master thesis in Germany or France (or vice versa)

ERASMUS Programs

Students' mobility

Erasmus+

Bachelor's degree and Master's degree

Selection criteria

a. ECTS provided for the year and acquired;
b. grade point average;
c. knowledge of the host country language or the one used for lessons;
d. motivation.

Selection: based on qualifications

WHEN

The academic year following the year of the application

Example for Master's degree:
Application must be done in Jenuary of 1° year to carry out the thesis period (or a part of it) in the Erasmus

WHERE

Institutions within the bilateral agreements signed by University partners

For the Department of Chemistry (2016/2017)

26 agreements
9 countries

→

Denmark (1) Estonia (1)
France (8) Greece (1)
Poland (2) Portugal (3)
United Kingdom (2) Spain (6)
Turkey (2)

Erasmus Placement/Traineeship

Bachelor's degree and Master's degree, Ph.D

Selection criteria

a. ECTS provided for the year and acquired
b. grade point average for the undergraduate and graduate students
c. final grades for Ph.D students
d. knowledge of the host country language or the one used for lessons;
e. submission of a training project
f. assessment interiew result

Selection: interview on training project

WHEN

The same academic year of the application

WHERE

free choice; acceptance letter of host University is needed

short periods, the grant covers part of the costs

Erasmus contact persons for the Department of Chemistry:

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http://www.erasmusplus.it/