



UNIVERSITÀ
DI CAMERINO

School of Science and Technology

Degree in
Chemistry

(Class **L - 27**)

STUDENT GUIDE

Course duration 3 years
Total Acquired Credits 180

Location:

Town **Camerino**

Address **via S. Agostino 1**

Academic Year 2010-2011

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2. **Presentazione**

While you are reading these information your eyes are using a chemical molecule, the retinale, to convert the visible light in nervous pulses that are received and elaborated to turn into image. While you are holding this brochure, in your muscles some chemical reactions are happening, which turn sugars into the energy you are using. If you place one hand on a chair, on your suit, if you graze your hair, if you are eating, if.. if.. You must know that you are dealing with compounds that are turned into other compounds through chemical reactions, anything you are doing. We are immersed in a world "totally" composed of molecules in movement. Chemistry is the science that studies these molecules and their transformations. Without chemical reactions, earth would be a planet without life. All the things that we use, we wear, we eat, we see around us are produced through controlled chemical reactions. Molecules are therefore fundamental for our life and you should be curious to know their structure, behaviour and characteristics that are extraordinarily fascinating and less complicated than you can expect.

The relevance of Chemistry in the modern world is underlined by the fervour of activity in such sector. In main industrialized Countries the percentage of growth in the chemical sector is approximately the double that the average in other sectors, and such growth is particularly in the field of new medicines, new materials, in the environment and in biotechnologies. A measure of the interest in chemical sciences is annually given by the number of scientific articles summarized in the "Chemical Abstract" data base: in 1960 the annual number was of 106.600 publications, while in 1975 more than tripled to 324.000. By extrapolation it can be estimated that actually they join over a million articles per year.

Up today the number of known compounds has overcome the 50 million (CAS Registry) and their number grows of six thousand unity a week; several of such compounds have never been found in nature. Such exponential growth of the chemical knowledge can be attributed to three main factors:

- understanding and control of the chemical reactions;
- ability to work with complex molecules;
- improvement of the scientific instrumentation.

In the light of the productive ferment above described, we can affirm that the discipline "Chemistry" has a great general importance for the society, both as enrichment of our cultural baggage and as ability to answer to mankind needs.

The primary cultural motivations of Science are tied up to the understanding of the universe around us, of the nature of matter and the nature of life. The observation and study of the universe is a dominion of Astronomy with the help of Physics; the intimate nature of matter is connected with atoms and molecules and, beyond, with the structure and components of the elementary particles. The Physics of high energies is dealing with such elementary particles, while atoms and molecules, whose behaviour is directly shown in the forms and properties of everything around us, are the object of Chemistry. The area related to the nature of life, that is perhaps the more urgent cultural area for the human needs, is shared between Biology and Chemistry: Biology studies the phenomenology of the living being, while Chemistry gives the fundamental bases for the understanding of living processes. Every other process (growth,

reproduction, mutation, death) is nothing else than a complicated sequence of chemical reactions. Besides his cultural values, Science is able and must give, at least potentially, an answer to the needs of the society. Chemistry is a discipline of extreme importance for the solution of the needs of society, more and more addressed to the improvement of the quality of life. This is in fact the chemist's job: to project reactions that can turn the existing chemical substances into new products useful to satisfy our needs. For instance: (i) the silicon-based materials for our computers are not found in nature, but are produced by the silica, drawn by the sand, through complex chemical processes, (ii) the taxol, a substance drawn by the bark of young trees of the *Taxus Brevifolia* of the Pacific, has been revealed extremely effective in the medical therapy of the tumour. To get of it as soon as 1 gram it is necessary to demolish 3-4 trees, but chemists have realized the synthetic production of this molecule in notable quantity and it is actually available for many patients.

The first level degree in Chemistry has the purpose to form graduates able to undertake the scientific career or to develop professional activity. The chemical research is essential in different fields and is the base of the development of knowledge in many fields of pure and applied sciences.

Modern society is not conceivable without the contribution of industrial chemical products, such as medicines, dyes, insecticides, fertilizers, ceramics, plastics and textile fibers.

The contribution of Chemistry is fundamental for the solution of important social problems as man's health, the improvement of quality of life, the development of new materials for the electronics or other special uses, for the search of alternative sources of energy and also for the safeguard of the environment.

A modern society in continuous development has therefore necessity of more and more graduates in Chemistry able to create new products and, contemporarily, to solve the problems of environment. A positive aspect of the First Level Degree in Chemistry is represented by the very favourable teacher-student relationship, in fact students can easily compare with the teaching staff and easily establish with teachers a profitable direct relationship. Given the experimental character of Chemistry, particular importance is given to the part of the practice in laboratory, for which an assiduous frequency is required.

3. *Obiettivi formativi del Corso e modalità di verifica del loro raggiungimento*

The main goal of the Chemistry Degree Course is the formation of a graduated with good basic skills and knowledge on chemistry, suitable for the introduction in job's activities requiring confidence with the scientific method, ability in applying innovative technologies and methodologies, in the use of complex instruments, also computer-based, in the effective use of the English language, both in written and oral forms, for the exchange of general information, in working within interdisciplinary groups with a well-defined degree of autonomy and to enter the job world.

The proposed curriculum is based on the first two years concerning basic and characterizing teachings, while the third year concerns more specialized and applicative teachings. The acquired skills and competences allow to better conform oneself to the evolution of the discipline, to interact with neighboring professionals and also to continue the studies in second level Degree Courses. The didactical organization is essentially based on the model of the "Chemistry

Eurobachelor" and on that drawn up by the Italian Chemical Society concerning the "core chemistry" basic contents for the first level degrees in the class 27. In particular:

- (a) a "core" of at last 90 ECTS in mathematics, physics, inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry and biochemistry;
- (b) a final stage activity of 15 ECTS;
- (c) semi-optional teachings on at last three additional "sub-disciplines", having each 5 ECTS;
- (d) optional teachings

Expected learning results:

4. *Conoscenze richieste per l'accesso (D.M. 270/04)*

Admission to studies for the Degree in Chemistry does not require specialized preparation; the knowledge needed to pass the Secondary School final exam, or any other High School- leaving certificate in other countries, is sufficient. The Chemistry Degree Course sets out a procedure before the beginning of didactical activities, on the basis of Didactical Regulation of the Course, in order to ascertain the mastery of the minimal pre-requisites, however this procedure is not a restraint for inscription to the course. The Chemistry Degree Course organizes facultative integration courses and activities with the aim to help new students filling up any formative lack in knowledge.

5. *Job opportunities*

The University of Camerino supplies the Diploma Supplement to all graduates. The graduates in Chemistry can develop their own profession as Junior Chemists in the following field:

1. Public and private research agencies;
2. Laboratories of analysis, control and quality assurance;
3. Chemical, Pharmaceutical and Biotechnological industries;
4. Free professional activity, especially in the sectors of safeguard of the environment, of maintenance of the cultural heritage, of health and energy.

Functions of Junior Chemist:

- to assist specialists in chemical research activities or in activities requiring application of chemical protocols;
- to carry out well defined protocols or procedures;
- to execute laboratory tests for the development of new products under the supervision of a Senior Chemist;
- to carry out chemical analyses and quality checks, that can require the knowledge and mastery of advanced chemical and instrumental techniques, on the basis of the specific product under control;
- to apply standard methodologies in the chemical analyses, in the direction of chemical laboratories, in pure and applied chemical advices and in any other activity of Junior Chemist professional as defined by the actual legislation;
- to deal with customers' demands, suggesting them on the correct use of products. To put in relationship the customers' requests with the development activities in laboratory, production and marketing.

Additionally, the Chemistry graduate can also continue the studies for attaining the second level Degree in Chemistry or first level Masters.

6. Didactical organization

The acquisition of skills and knowledges from the students is measured in ECTS. The credits correspond to the work, consisting of individual study and exercise and laboratory activities, required to each student to achieve the degree in Chemistry.

The mean amount of learning work carried out in one year by a student engaged full time in university studies and starting from an adequate preparation is fixed in 60 credits.

To graduate in Chemistry the student must acquire 180 credits.

For the students that enrol in A.A. 2009/2010 the didactical activities will start on September 30 with the National test for Science and Technologies Faculty.

The didactical activities are offered into 2 semesters following this calendar:

I Semester October, 4 2009 – January, 28 2010

II Semester February, 28 2010 – June, 10 2010

Between the semesters there is a short period of stop of didactical activities that the teacher can use to carry out partial checks.

Information on the lessons calendar are available in:

<http://www.unicam.it/studenti>.

It is mandatory to attend particularly for laboratory activities.

At the beginning of the academic year the examination data of each teaching (at least 8 per year) will be communicated.

There are 5 data per year for the final exam.

Facultative integration courses and activities are organized for first year students in the following disciplines: Mathematics, Physics, Chemistry.

Students that enroll must submit to an entry test that will be held following the national rules.

Complete formative curriculum

I year					
I semester					
Titolo attività formativa	SSD	CFU *	Unità didattiche*	Tipologia *	Tipologia di valutazione (voto o idoneità)
Matematica	MAT/05	8		8 a	Voto
Chimica Generale Inorganica e Laboratorio	CHIM/03	7	Chimica Generale Inorganica	a	Voto
		7	Laboratorio di Chimica Generale Inorganica	b	
Fisica e Laboratorio	FIS/01	12		a	Voto
Inglese	L-LIN/12	6		f	Voto
II semester					
Titolo attività formativa	SSD	CFU *	Unità didattiche*	Tipologia *	Tipologia di valutazione

					(voto o idoneità)
Matematica	MAT/05	4		a	voto
Chimica Fisica 1 e Laboratorio	CHIM/02	6	Chimica Fisica 1	a	Voto
		4	Laboratorio di Chimica Fisica 1	b	
Informatica e Applicazioni Numeriche	INF/01	5		a	Voto
Fisica e Laboratorio	FIS/01	6		a	Voto

II year					
I semester					
Titolo attività formativa	SSD	CFU *	Unità didattiche *	Tipologia *	Tipologia di valutazione (voto o idoneità)
Nozioni Generali di Economia	SECS-P/07	4		c	Voto
Chimica Organica 1 e Laboratorio	CHIM/06	7	Chimica Organica 1	a	Voto
		3	Laboratorio di Chimica Organica 1	a	
Chimica Analitica 1 e Laboratorio	CHIM/01	6	Chimica Analitica 1	a	Voto
		6	Laboratorio Chimica Analitica 1	b	
II semester					
Titolo attività formativa	SSD	CFU *	Unità didattiche *	Tipologia *	Tipologia di valutazione (voto o idoneità)
Biochimica	BIO/10	6		b	Voto
Chimica Fisica 2 e Laboratorio	CHIM/02	6	Chimica Fisica 2	b	Voto
		4	Laboratorio di Chimica Fisica 2	a	
Chimica degli Alimenti	CHIM/10	6		c	Voto
Chimica Inorganica 1 e Laboratorio	CHIM/03	5	Chimica Inorganica 1	a	Voto
		5	Laboratorio di Chimica Inorganica 1	b	

III year					
I semester					
Titolo attività formativa	SSD	CFU*	Unità didattiche *	Tipologia *	Tipologia di valutazione (voto o idoneità)
Certificazioni	IUS/14	4		c	Voto
Chimica Analitica 2 e Laboratorio	CHIM/01	6	Chimica Analitica 2	a	Voto
		6	Laboratorio di Chimica Analitica 2	b	
Chimica Organica 2 e Laboratorio	CHIM/06	7	Chimica Organica 2	b	Voto
		7	Laboratorio di Chimica Organica 2	b	
II semester					
Titolo attività formativa	SSD	CFU*	Unità didattiche *	Tipologia *	Tipologia di valutazione (voto o idoneità)
Chimica e Tecnologia dei Materiali	CHIM/07	6		c	Voto
Attività libere		12		d	Voto
Stage		10		f	
Prova finale		5		e	
Totale CFU*		180			

*** Legenda:**

CFU: è l'abbreviazione di Credito Formativo Universitario. Si tratta della modalità utilizzata nelle per misurare il carico di lavoro richiesto allo studente, convenzionalmente 1 CFU è pari a 25 ore di lavoro (indipendentemente se questo sia svolto come studio personale o come frequenza a laboratori o lezioni).

Unità didattiche: alcune attività formative possono prevedere uno svolgimento modulare e suddividersi in diverse unità didattiche (o moduli) affidate anche a docenti diversi. L'esame finale è unico.

Tipologia dell'Attività Formativa:

- A. attività formative di base
- B. attività formative caratterizzanti
- C. attività formative affini o integrative
- D. attività formative a scelta dello studente
- E. per la prova finale e per la conoscenza della lingua straniera
- F. altre (ulteriori conoscenze linguistiche, abilità informatiche e relazionali, stage etc.)
- G. ambito aggregato per crediti di sede Tirocinio

7. Teaching activities and teachers

Attachment A of this handbook contains in detail any information about active courses and relative teachers offered by School of Science and Technology and Degree Course for the following sets of students

- Freshmen starting **in 2010 and attend the 1st year**
- Students who started in 2009 and **attend the 2nd year**
- Students who started in 2008 and **attend the 3rd year**

8. Curricula for teachers, programs of individual learning activities, educational facilities

The programs of individual learning activities with their descriptions are made available by teachers on the University website, under the section 'Courses'.

Through this "gateway" it is possible to access the course lecturers' CVs and a description of the educational and scientific facilities available.

9. Teaching support services

• Post-graduate orientation

There is often a disconnect between the learning program at a university and the reality of the workplace into which the student needs to enter. The orientation service provides guidance both to those graduating and to postgraduates, in collaboration with the Internship and Placement Service, as well as room for reflection on the choices of support activities for vocational training. The initiative "Young People + University = Work" is of particular relevance here. This takes place each year, generally in the autumn. University students and new graduates are invited to attend the event to have an opportunity to listen to the accounts given by many different professionals, to meet and to establish direct contacts with company representatives, and to get to know experts from the world of work so they can start to plan out their own personal career path.

• The mentoring program

Mentoring contributes to the cultural and professional training of the student, encouraging wider and more and active participation throughout the entire degree course.

The mentoring program has the following objectives:

- Assist the student in all aspects of their study
- Encourage different ways of participating in the training process

- Remove barriers to education through initiatives tailored to the needs, aptitudes and requirements of each individual student.

Unicam's Mentoring Program uses and provides specific tutoring activities for both groups and individuals.

It organises a flexible range of teaching tutorials during the teaching year, conducted by tutors who have been chosen for their particular profiles aimed at activities for students who work and for the different teaching approaches required for e-learning.

- Support tutoring: provided by experienced students with the task of helping younger students in organizing their studies and get acquainted with the new environment.
- Group Tutoring: provides scheduled meetings with the course teachers, designed to highlight and resolve, also through input from the students, any problems encountered in the teaching course.
- Individual Tutoring: UNICAM assigns to each student a 'teaching tutor' whose task is to follow and advise the student throughout their course of study through regular meetings and through meetings requested by the student.
- Teaching tutoring: related specifically to basic science courses and to English and organized by means of supplementary courses, especially devoted for filling gaps in the student knowledge.

• **The opportunity to study abroad**

Unicam offers many possibilities for international mobility:

ERASMUS for study

The program allows you to spend a period of study abroad (from 3 to 12 months), providing the opportunity to take courses, to take advantage of university facilities, to conduct research aimed at drafting your degree thesis, and to obtain recognition of exams taken abroad, provided they have been pre-designated in an appropriate study program.

Students who are interested can take part in the annual call from the University published in the period December - February.

Erasmus Student Placement (internship)

Starting in the 2007/2008 academic year, within the Erasmus program it is possible to hold internships (from 3 to 12 months) in enterprises, in research centres, and in European training centres, ensuring a recognition of curricular activities carried out abroad, provided there is agreement in advance with their respective Erasmus coordinators.

The Degree in Chemistry has established agreements within the Erasmus program with the following European universities:

Nazione	Università	Lingua	N. Borse	Periodo	Attività
FI - Finlandia	<i>University of Oulu</i>	INGLESE	2	6 mesi	<i>Tesi</i>
B - Belgio	<i>Université Libre de Bruxelles</i>	FRANCESE	1	6 mesi	<i>Corsi/Tesi</i>
B - Belgio	<i>University of Gent</i>	FRAN/INGL	1	10 mesi	<i>Corsi/Tesi</i>
B - Belgio	<i>University of Antwerp</i>	FRANCESE	1	6 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de Extremadura</i>	SPAGNOLO	2	9 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de Granada</i>	SPAGNOLO	1	10 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de Burgos</i>	SPAGNOLO	1	6 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de Zaragoza</i>	SPAGNOLO	2	6 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de la Rioja</i>	SPAGNOLO	1	10 mesi	<i>Corsi/Tesi</i>
ES - Spagn	<i>Universidad de Sevilla</i>	SPAGNOLO	3	6 mesi	<i>Corsi/Tesi</i>
FR - Francia	<i>Université de Pau et des Pays de l'Adour</i>	FRANCESE	1	6 mesi	<i>Corsi/Tesi</i>

FR - Francia	<i>Institut National Polytechnique de Toulouse</i>	FRANCESE	2	6 mesi	<i>Corsi/Tesi</i>
FR - Francia	<i>Université Pierre et Marie Curie Paris VI</i>	FRANCESE	2	3 mesi	<i>Corsi/Tesi</i>
FR - Francia	<i>Université Louis Pasteur - Strasbourg</i>	FRANCESE	1	6 mesi	<i>Corsi/Tesi</i>
HU - Ungheria	<i>University of Szeged</i>	INGLESE	1	6 mesi	<i>Corsi/Tesi</i>
RO - Romania	<i>University Dunarea de Jos Galati</i>	INGLESE	3	5 mesi	<i>Corsi/Tesi</i>
RO - Romania	<i>Universitatea Alexandru Ioan Cuza - Iasi</i>	INGLESE	5	6 mesi	<i>Corsi/Tesi</i>
PT - Portogallo	<i>Instituto Superior Tecnico Lisboa</i>	INGLESE	2	6 mesi	<i>Corsi/Tesi</i>
DE - Germania	<i>Johann Wolfgang Goethe Universität</i>	TEDESCO	2	6 mesi	<i>Corsi/Tesi</i>
PL - Polonia	<i>Univwersytet Wroclawski</i>	INGLESE	2	3 mesi	<i>Corsi/Tesi</i>
GR - Grecia	<i>University of Ioannina</i>	INGLESE	3	6 mesi	<i>Corsi/Tesi</i>
UK - Regno Unito	<i>University of Aberdeen</i>	INGLESE	2	5 mesi	<i>Corsi/Tesi</i>
MT - Malta	<i>University of Malta</i>	INGLESE	2	6 mesi	<i>Corsi/Tesi</i>
NL - Paesi Bassi	<i>Universiteit Utrecht</i>	INGLESE	3	6 mesi	<i>Corsi/Tesi</i>

• **Internships**

The connection between the university and work is one of the priorities at Unicam. Unicam organises meetings and dialogues amongst students, graduates, professionals and companies. In this spirit, the internship is an important tool allowing students, both graduates or recently graduated, to 'practice' in a real working environment, an opportunity to learn directly about working-life and the opportunity to develop, in some cases, a specific expertise.

The University of Camerino has agreements with more than 1800 companies, institutions, administrative and professional offices, where students, both graduates and PhD students, may pursue their internship activities. You can do an internship both in Italy and abroad.

Services offered

- Management of a database (Unicam Stage) through which internships are offered, to be carried out at companies or at public and private agencies
- Activation of post-graduate internships in companies
- Insertion of the CVs of UNICAM graduates in the online database UnicamJob
- Support activities during entry in the workplace
- Participation in the program 'Work Kit' ('Borsa Lavoro') (a net of online services and an open system for assembling inquiries and offers of work via the Internet: www.unicam.it/laureati/mondolavoro/index.asp)

• **Services for welcoming students with disabilities**

The 'Welcome Service for Disabled Students' aims at providing students with disabilities equal opportunities in dealing with their studies and the chance to fully live the college experience.

This objective is pursued through outreach activities, through technology, and through staff specially dedicated to students and to the removal of the physical and cultural barriers standing in the way of learning and in the way of everyday life.

By contacting the Service Tutors, it is possible map out a training plan, taking into account the particular disability and the individual goals, through the defining of solutions and through personalised participation.

Facilities and services:

- Technological aids and directed teaching support
- Personalised examinations (for entry and achievement)
- Specialised tutoring
- Transport and relocation
- Procurement and delivery of library materials
- Exemption and reduction of taxes
- Furnished housing with a possible subsidy
- For the companion
- Access to university facilities
- Counseling
- Access to the sports facilities of C.U.S.
- Grants towards participation in the Socrates / Erasmus programmes
- Internships and training directed towards finding employment

10. *Quality assurance*

The Bachelor course in Chemistry is within the UNICAM quality management system **certificate ISO 9001:2008** (from **AFAQ-France**, a French leader and one of the first certification bodies at the global level) which guarantees students the quality of services provided. The guarantee is via a rigorous analysis of internal organizational procedures and the prompt addressing of any defects whether detected or reported by the students themselves. The Quality Management System includes the following support services for students: orientation, mentoring, international mobility, internships and placement, communication. These integrate with and support the educational activities, so as to contribute to the complete training of the student.



The chemistry course has also been eurobachelor certification

Annex A

I Year

Attività formativa	Modulo	SSD attività	Semestre	Tipologia attività (*)	CFU	n. ore lez.	ore eserc	ore lab	Docente Cognome	Docente Nome	Scuola di appartenenza
Matematica		MAT/05	I,II	a	12.0	88	12		Teodori	Albarosa	Scienze e tecnologie
Fisica e Laboratorio	Fisica I	FIS/01	I	a	6.0	40	12		Simonucci	Stefano	Scienze e tecnologie
Fisica e Laboratorio	Fisica II	FIS/01	II	a	6.0	40	12		Marchesoni	Fabio	Scienze e tecnologie
Chimica Generale Inorganica e Laboratorio	Chimica Generale Inorganica	CHIM/03	I	a	7.0	56			Cingolani	Augusto	
Chimica Generale Inorganica e Laboratorio	Laboratorio di Chimica Generale Inorganica	CHIM/03	I	b	7.0	24	48		Poeti	Giovanni	
Informatica e Applicazioni Numeriche		INF/01	II	a	5.0	32	12		Conti	Paolo	Scienze e tecnologie
Chimica Fisica 1 e Laboratorio	Chimica Fisica 1	CHIM/02	II	a	6.0	48					
Chimica Fisica 1 e Laboratorio	Laboratorio di Chimica Fisica 1	CHIM/02	II	b	4.0	16		24	Nobili	Francesco	Scienze e tecnologie
Lingua Inglese		L-LIN/12	I	f	6.0	60					

II Year

Attività formativa	Modulo	SSD attività	Semestre	Tipologia attività (*)	CFU	n. ore lez.	ore eserc	ore lab	Docente Cognome	Docente Nome	Scuola di appartenenza
Chimica Organica 1 e Laboratorio	Chimica Organica 1	CHIM/06	I	a	7.0	56			Palmieri	Gianni	Scienze e tecnologie
Chimica Organica 1 e Laboratorio	Laboratorio di Chimica Organica 1	CHIM/06	I	a	3.0			36	Palmieri	Gianni	Scienze e tecnologie
Chimica Analitica 1 e Laboratorio	Chimica Analitica 1	CHIM/01	I	a	6.0	48			Tossici	Roberto	Scienze e tecnologie
Chimica Analitica 1 e Laboratorio	Laboratorio di Chimica Analitica 1	CHIM/01	I	b	6.0	16		48			

Nozioni Generali di Economia		SECS-P/07	I	c	4.0	32					
Biochimica		BIO/10	II	b	6.0	40		12			
Chimica degli Alimenti		CHIM/10	II	c	6.0	32		24	Fiorini	Dennis	Scienze e tecnologie
Chimica Fisica 2 e Laboratorio	Chimica Fisica 2	CHIM/02	II	b	6.0	40		12	Bacchiocchi	Corrado	Scienze e tecnologie
Chimica Fisica 2 e Laboratorio	Laboratorio di Chimica Fisica 2	CHIM/02	II	b	4.0	16		24			
Chimica Inorganica 1 e Laboratorio	Chimica Inorganica 1	CHIM/03	II	a	5.0	40			Santini	Carlo	Scienze e tecnologie
Chimica Inorganica 1 e Laboratorio	Laboratorio di Chimica Inorganica 1	CHIM/03	II	b	5.0	24		24	Burini	Alfredo	Scienze e tecnologie

III Year

Attività formativa	Modulo	SSD attività	Semestre	Tipologia attività (*)	CFU	n. ore lez.	ore eserc	ore lab	Docente Cognome	Docente Nome	Scuola di appartenenza
Chimica Organica 2 e Laboratorio	Chimica Organica 2	CHIM/06	I	b	7.0	48	12		Marcantoni	Enrico	Scienze e tecnologie
Chimica Organica 2 e Laboratorio	Laboratorio di Chimica Organica 2	CHIM/06	I	b	6.0	32		24	Ballini	Roberto	Scienze e tecnologie
Chimica Organica 2 e Laboratorio	Laboratorio di Chimica Organica 2	CHIM/06	I	c	1.0			12	Ballini	Roberto	Scienze e tecnologie
Chimica Fisica 2 e Laboratorio	Chimica Fisica 2	CHIM/02	II	b	5.0	40			Bacchiocchi	Corrado	Scienze e tecnologie
Chimica Fisica 2 e Laboratorio	Chimica Fisica 2	CHIM/02	II	g	1.0		12		Bacchiocchi	Corrado	Scienze e tecnologie
Chimica Fisica 2 e Laboratorio	Laboratorio di Chimica Fisica 2	CHIM/02	II	g	4.0	16		24			
Chimica e Tecnologia dei Materiali		CHIM/03	I	g	2.0	16					
Chimica e Tecnologia dei Materiali		CHIM/05	I	b	2.0			24			
Chimica e Tecnologia dei Materiali		CHIM/06	I	b	2.0	16			Marcantoni	Enrico	Scienze e tecnologie

Elective course

Attività formativa	Modulo	SSD attività	Semestre	Tipologia attività (*)	CFU	n. ore lez.	ore eserc	ore lab	Docente Cognome	Docente Nome	Scuola di appartenenza
Analisi Biochimico-Cliniche		BIO/12	I	d	4.0	32		12			
Analisi Chimica Gascromatografica		CHIM/01	I	d	4.0	24	12				
Analisi Chimica Spettroscopica		CHIM/01	I	d	4.0	32					
Biochimica Applicata		BIO/10	II	d	4.0	24		12			
Biopolimeri		BIO/10	II	d	4.0	32					
Chimica Analitica dei Beni Culturali		CHIM/12	I	d	4.0	24		12	Zamponi	Silvia	Scienze e tecnologie
Chimica dei Composti di Coordinazione		CHIM/03	II	d	4.0	32			Cingolani	Augusto	
Chimica Farmaceutica e Tossicologica		CHIM/08	I	d	4.0	32					
Chimica Teorica		CHIM/02	II	d	4.0	32			Lavenda	Bernard Howard	Scienze e tecnologie
Cromatografia		CHIM/01	I	d	4.0	24		12			
Didattica della Chimica		CHIM/03	II	d	4.0	32					
Enzimologia		BIO/10	II	d	4.0	16		24			
Sintesi Catalitica Asimmetrica		CHIM/06	II	d	4.0	32			Cimarelli	Cristina	Scienze e tecnologie
Spettroscopia Molecolare		CHIM/02	II	d	4.0	32			Lavenda	Bernard Howard	Scienze e tecnologie
Storia della Chimica		CHIM/03	II	d	4.0	32			Gioia Lobbia	Giancarlo	

Legend:

(*)

- a introductory course
- b core course
- c supplementary course
- d elective course
- e for the final exam and for knowledge of a foreign language
- f other (additional language skills, computer skills, internship/work experience stage etc.)
- s stage