



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

REGOLAMENTO DIDATTICO DEL CORSO

LM-54 CHEMICAL INNOVATION AND REGULATION

Sede di Bologna

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Corso di Laurea Magistrale in “Chemical Innovation and Regulation”

ART. 1 REQUISITI PER L'ACCESSO AL CORSO

• Conoscenze richieste per l'accesso

Per essere ammessi al corso di laurea magistrale in “Chemical Innovation and Regulation” occorre essere in possesso di una laurea o del diploma universitario di durata triennale, ovvero di altro titolo di studio conseguito all'estero, riconosciuto idoneo.

Occorre, altresì, il possesso dei seguenti requisiti curriculari:

Avere conseguito la Laurea in una delle seguenti classi:

- ✦ ex D.M. 270/04: L-13 Scienze biologiche
L-27 Scienze e tecnologie chimiche
L-29 Scienze e tecnologie farmaceutiche
L-32 Scienze e tecnologie per l'ambiente e la natura
L-7 Ingegneria civile e ambientale L-9
Ingegneria industriale
- ✦ ex. D.M. 509/99:
 - 8 Ingegneria civile e ambientale
 - 9 Ingegneria industriale
 - 12 Scienze biologiche
 - 21 Scienze e tecnologie chimiche
 - 27 Scienze e tecnologie per l'ambiente e la natura
 - 24 Scienze e tecnologie farmaceutiche
- ✦ Previgente ordinamento (ante ex D.M. 509/99): - Laurea in Chimica,
 - Chimica Industriale,
 - Ingegneria chimica,
 - Farmacia,
 - Chimica e tecnologie farmaceutiche,
 - Biologia
 - Scienze ambientali

oppure altro titolo di studio conseguito all'estero, nelle discipline Chimiche, Chimiche industriali, Ingegneria chimica, Scienze farmaceutiche, Scienze biologiche, Scienze ambientali e riconosciuto idoneo dal Consiglio del Corso di Laurea Magistrale.

Occorre, inoltre, avere acquisito almeno 60 CFU in discipline scientifiche di base, di cui almeno 25 CFU nei seguenti settori scientifico disciplinari: CHIM/01-CHIM/12; BIO/10-BIO/11; ING-IND/22-ING-IND/27 o discipline analoghe nel caso di titolo di studio conseguito all'estero.

L'ammissione al Corso di Laurea Magistrale è subordinata, inoltre, al superamento di una verifica dell'adeguatezza della personale preparazione che avverrà secondo le modalità definite nel punto modalità di ammissione.

È richiesta inoltre la conoscenza della lingua inglese di livello B2 del Quadro comune europeo di riferimento per la conoscenza delle lingue.

- **Modalità di ammissione**

La verifica dell'adeguatezza della personale preparazione effettuata da parte di una Commissione composta da rappresentanti delle tre Università consorziate e nominata dal Consiglio del Corso di Laurea Magistrale, avverrà nei termini resi noti tramite il Portale di Ateneo, tramite esame del curriculum accademico del candidato, della sua ulteriore conoscenza della lingua inglese, del profilo personale e motivazionale, dalla presenza di lettere di referenza redatte da esperti dei settori scientifici oggetto del Corso.

Le informazioni necessarie dovranno essere fornite dal candidato all'atto della richiesta di ammissione, tramite applicativo disponibile su sito del Corso di Laurea Magistrale www.emmcchir.net

ART. 2 PIANI DI STUDIO INDIVIDUALI

È prevista la possibilità di presentazione di piani di studio individuali con le modalità, i criteri e i termini resi noti tramite il Portale di Ateneo.

I piani di studio individuali, approvati dal Consiglio di corso di studi, non possono comunque prescindere dal rispetto dell'ordinamento e delle linee guida definite dagli Organi competenti.

Qualora il piano di studio preveda la scelta di attività formative attivate presso corsi di studio a numero programmato, l'ammissione alle stesse deve essere previamente approvata anche dal Consiglio di corso di studio a numero programmato sulla base di criteri da questo preventivamente individuati.

ART. 3 MODALITÀ DI SVOLGIMENTO DELLE ATTIVITÀ FORMATIVE E TIPOLOGIA DELLE FORME DIDATTICHE

Il piano didattico allegato indica le modalità di svolgimento delle attività formative e la relativa suddivisione in ore di didattica frontale, di esercitazioni pratiche o di tirocinio, nonché la tipologia delle forme didattiche. Eventuali ulteriori informazioni ad esse relative saranno rese note annualmente sul Portale di Ateneo.

ART.4 FREQUENZA E PROPEDEUTICITÀ

L'obbligo di frequenza alle attività didattiche è indicato nel piano didattico allegato, così come le eventuali propedeuticità delle singole attività formative.

Le modalità e la verifica dell'obbligo di frequenza, ove previsto, sono stabilite annualmente dal Corso di Studio in sede di presentazione della programmazione didattica e rese note agli studenti prima dell'inizio delle lezioni tramite il Portale di Ateneo.

ART. 5 PROVE DI VERIFICA DELLE ATTIVITÀ FORMATIVE

Il piano didattico allegato prevede i casi in cui le attività formative si concludono con un esame con votazione in trentesimi ovvero con un giudizio di idoneità.

Le modalità di svolgimento delle verifiche sono stabilite annualmente dal Corso di Studio in sede di presentazione della programmazione didattica e rese note agli studenti prima dell'inizio delle lezioni tramite il Portale di Ateneo.

ART. 6 ATTIVITÀ FORMATIVE A SCELTA DELLO STUDENTE

Il Corso di studio considera coerenti con il progetto formativo le attività formative individuate dal Consiglio di Corso di studio e previste nell'allegato piano didattico.

Se lo studente sceglie un'attività formativa diversa da quelle considerate coerenti, secondo i suddetti criteri predeterminati, deve fare richiesta al Consiglio di corso di studio nei termini previsti annualmente e resi noti tramite pubblicazione sul Portale di Ateneo.

Il Consiglio valuterà la coerenza della scelta con il percorso formativo dello studente.

ART. 7 CRITERI DI RICONOSCIMENTO DEI CREDITI ACQUISITI IN CORSI DI STUDIO DELLA STESSA CLASSE

I crediti formativi universitari acquisiti sono riconosciuti per non meno della metà e fino a concorrenza dei crediti dello stesso settore scientifico disciplinare previsti dal piano didattico allegato.

Qualora, effettuati i riconoscimenti in base alle norme del presente regolamento, residuino crediti non utilizzati, il Consiglio di Corso di studio può riconoscerli valutando il caso concreto sulla base delle affinità didattiche e culturali.

Con riferimento ai corsi di studio erogati in lingua diversa dall'italiano, il riconoscimento è relativo ad insegnamenti impartiti o alle attività formative svolte in tale lingua.

ART. 8 CRITERI DI RICONOSCIMENTO DEI CREDITI ACQUISITI IN CORSI DI STUDIO DI DIVERSA CLASSE, PRESSO UNIVERSITÀ TELEMATICHE E IN UNIVERSITÀ ESTERE

I crediti formativi universitari acquisiti sono riconosciuti dal Consiglio di Corso di studio sulla base dei seguenti criteri:

- analisi del programma svolto;
- valutazione della congruità dei settori scientifico disciplinari e dei contenuti delle attività formative in cui lo studente ha maturato i crediti con gli obiettivi formativi specifici del corso di studio e delle singole attività formative da riconoscere, perseguendo comunque la finalità di mobilità degli studenti.

Il riconoscimento è effettuato fino a concorrenza dei crediti formativi universitari previsti dal piano didattico allegato.

Qualora, effettuati i riconoscimenti in base alle norme del presente regolamento, residuino crediti non utilizzati, il Consiglio di Corso di studio può riconoscerli valutando il caso concreto sulla base delle affinità didattiche e culturali.

Con riferimento ai corsi di studio erogati in lingua diversa dall'italiano, il riconoscimento è relativo ad insegnamenti impartiti o alle attività formative svolte in tale lingua.

ART. 9 CRITERI DI RICONOSCIMENTO DELLE CONOSCENZE E ABILITÀ EXTRAUNIVERSITARIE

Possono essere riconosciute competenze acquisite fuori dall'Università nei seguenti casi:

- conoscenze e abilità professionali certificate ai sensi della normativa vigente in materia;
- conoscenze e abilità maturate in attività formative di livello post secondario alla cui realizzazione e progettazione abbia concorso l'Università.

La richiesta di riconoscimento sarà valutata dal Consiglio di Corso di studio tenendo conto delle indicazioni date dagli Organi Accademici e del numero massimo di crediti riconoscibili fissato nell'ordinamento didattico del corso di studio.

Il riconoscimento potrà avvenire qualora l'attività sia coerente con gli obiettivi formativi specifici del corso di studio e delle attività formative che si riconoscono, visti anche il contenuto e la durata in ore dell'attività svolta.

ART.10 TIROCINIO CURRICULARE

Il Corso di studio prevede un tirocinio curriculare obbligatorio finalizzato alla preparazione della **prova finale / tesi di laurea** o comunque collegato ad un progetto formativo mirato ad affinare il suo processo di apprendimento e formazione, da svolgersi secondo le procedure stabilite dal Regolamento generale tirocini di Ateneo e dai programmi internazionali di mobilità.

ART.11 MODALITÀ DI SVOLGIMENTO DELLA PROVA FINALE

- **Caratteristiche della Prova finale**

La prova finale per il conseguimento della laurea magistrale consiste nella redazione e nella discussione pubblica di una tesi scritta ed elaborata in modo originale dallo studente su un argomento coerente con gli obiettivi del corso di studio, sotto la guida di un relatore.

La prova finale può essere collegata a un progetto o a una attività di tirocinio.

La dissertazione deve dimostrare la padronanza degli argomenti, capacità critica, l'attitudine a operare in modo autonomo e una capacità di comunicazione di buon livello.

- **Modalità di svolgimento della prova finale**

La prova finale consiste nella presentazione da parte dello studente dei risultati scientifici conseguiti e riportati nella tesi di Laurea Magistrale, davanti alla Commissione di Laurea, seguita dalla discussione con la Commissione. La Commissione di Laurea è composta da docenti dell'Università consorziata presso cui si svolge la discussione (Research Host University), integrata da almeno un membro di una delle altre Università consorziate e designato dal Consiglio di Corso di Laurea Magistrale. La composizione dovrà essere coerente con le linee guida dell'Ateneo presso cui si svolge la discussione.

La Commissione Paritetica docenti-studenti ha espresso parere favorevole sulla coerenza dei crediti assegnati alle singole attività formative e gli specifici obiettivi formativi programmati, ai sensi dell'articolo 12 comma 3 del DM 270/04.



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

TEACHING REGULATIONS OF THE MASTER DEGREE

LM-54 CHEMICAL INNOVATION AND REGULATION

Bologna Campus

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Master Degree Course in “Chemical Innovation and Regulation”

UniBo is the Alma Mater Studiorum Università di Bologna

ART. 1 ADMISSION REQUIREMENTS

• Entry requirements

In order to be admitted to the Master Degree program in “Chemical Innovation and Regulation” students must possess a first cycle degree or other suitable qualification obtained abroad.

Moreover, students must possess the following curricular requirements:

A first cycle degree in one of the following Classes:

- ☐ ex D.M. 270:
 - L-13 Biological sciences
 - L-27 Chemical sciences and technology
 - L-29 Pharmaceutical sciences and technology
 - L-32 Environmental and natural sciences and technology
 - L-7 Civil and environmental engineering
 - L-9 Industrial engineering

- ☐ ex. D.M. 509/99:
 - 8 Civil and environmental engineering
 - 9 Industrial engineering
 - 12 Biological sciences
 - 21 Chemical sciences and technology
 - 27 Environmental and natural sciences and technology
 - 24 Pharmaceutical sciences and technology

- ☐ Four- or five-years degree valid before D.M. 509/99
 - Chemistry
 - Industrial Chemistry
 - Chemical engineering
 - Pharmacy
 - Pharmaceutical sciences and technology
 - Biology
 - Environmental sciences

Or any other Degree obtained abroad in the fields of Chemistry, Industrial Chemistry, Chemical engineering, Pharmaceutical sciences, Biological sciences, Environmental sciences, considered valid by the Degree Programme Board.

Moreover, students must have achieved at least 60 credits in basic scientific disciplines, of which at least 25 in the following disciplines: CHIM/01-CHIM/12; BIO/10-BIO/11; ING-IND/22-ING-IND/27 or in equivalent disciplines in case of Degrees obtained abroad.

Admission to the master degree programme is also subject to the assessment of students’ personal knowledge which will take place according to the procedure defined in the paragraph “assessment of personal knowledge”.

English language knowledge at B2 level (European classification) is required for the admission to the Degree programme.

- **Assessment of personal knowledge**

Students' personal knowledge will be assessed as it follows.

An Admission Board composed by teachers from the three Partner Universities and approved by the Degree Programme Board will be in charge of the assessment.

The assessment rules will be published on UniBo web portal and will consist in the evaluation of the academic curriculum of candidates, their in-depth knowledge of the English language, their CV and personal motivation and the analysis of possible reference letters provided by experts in the fields object of the Degree programme.

All the information required for the assessment must be provided by candidates during the submission of their application, using the web tool available on the Degree Programme official web site: www.emmcchir.net

ART. 2 INDIVIDUAL STUDY PLANS

Students will be allowed to present individual study plans according to the methods, deadlines and criteria published on Unibo web site. The individual study plans, approved by the Degree Programme Board, must be compliant with the teaching regulations and the guidelines defined by the competent bodies.

If students choose teaching activities that are activated in degree programmes with restricted access, the choice must also be authorized by the concerned Degree programme boards, based on criteria previously defined.

ART. 3 CHARACTERISTICS OF THE DIFFERENT TEACHING ACTIVITIES

Detailed information for each teaching activity is described in the attached Teaching Plan, including the partition of the overall hour amount into lectures, practical exercises and internship as well as the type of teaching methods.

Further information will be made available every year on UniBo web portal.

ART. 4 MANDATORY ATTENDANCE AND RULES FOR EXAMS SEQUENCING

The rules of compulsory attendance to learning activities are described in the annexed Teaching Plan, as well as the required sequencing of some exams.

The methods of verification of compulsory attendance will be defined annually by the Degree Programme Board and will be notified to students before the beginning of lectures on Unibo web site.

ART. 5 ASSESSMENT OF LEARNING ACTIVITIES

According to the attached Teaching Plan learning activities will be graded with a numeric mark or through a pass/non pass grade.

Assessment methods of learning activities shall be defined annually by the Degree Programme Board, during the definition of the regular teaching plan and published on UniBo web Portal.

ART. 6 ELECTIVE LEARNING ACTIVITIES

The Degree Programme Board considers all the learning activities defined by the Degree Programme Board and listed in the annexed Teaching Plan consistent with the teaching project.

If a student intends to attend one learning activity that is not included in the previewed list, she/he must submit a request to the Degree Programme Board within the deadlines and conditions published on UniBo web portal.

The Board shall verify the coherence of the request with the student's own study plan.

ART. 7 CRITERIA FOR RECOGNITION OF CREDITS PREVIOUSLY ACHIEVED IN THE SAME CLASS

Credits will be recognized from at least a half up to the number of credits that have been achieved for the same scientific disciplinary field in the annexed Teaching Plan.

If the number of recognised credits is lower than the number of achieved credits, the Degree Programme Board may also determine the validity of the residual credits, upon the assessment of each specific case.

In case of Degree Programs taught in a language other than Italian, the recognition of credits will concern teaching activities held in that language.

ART. 8 CRITERIA FOR RECOGNITION OF CREDITS PREVIOUSLY ACHIEVED IN DEGREE PROGRAMMES OF DIFFERENT CLASSES, DISTANCE LEARNING UNIVERSITIES, OR INTERNATIONAL DEGREE PROGRAMMES

Credits will be recognized by the Degree Programme Board according to the following criteria:

- evaluation of the course contents;
- analysis of the coherence of the scientific disciplinary fields and the contents of the teaching activities in which the student achieved credits with the learning outcomes of the Degree Programme and the specific teaching activities to be recognised, with the general aim to promote students' mobility.

Credits will be recognized up to the number of credits that have been achieved for the same scientific disciplinary field in the annexed Teaching Plan.

If the number of recognised credits is lower than the number of achieved credits, the Degree Programme Board may also determine the validity of the residual credits, upon the assessment of each specific case.

In case of Degree Programs taught in a language other than Italian, the recognition of credits will concern teaching activities held in that language.

ART. 9 CRITERIA FOR RECOGNITION OF SKILLS AND KNOWLEDGE ACHIEVED OUTSIDE THE UNIVERSITY SYSTEM

Skills and knowledge achieved outside the university system may be recognized in the following cases:

- professional knowledge and skills officially certified by a competent authority;
- knowledge and skills obtained in higher education activities designed and realized in cooperation with a University.

The request for recognition shall be evaluated by the Degree Programme Board in compliance with the guidelines issued by the Academic Bodies and the Degree Programme Teaching Regulations.

Recognition is possible only if the activity is coherent with the learning outcomes of the Degree Programme and the specific learning activity that will be considered equivalent, in compliance with the content and duration of the performed activity.

ART. 10 INTERNSHIP

The master's degree programme includes a compulsory internship aimed at the preparation of the **final examination / thesis**, or linked to a learning project aiming to develop learning and education of the student. The internship must be carried out in compliance with Unibo Training Regulations or International Mobility Programmes for Traineeships rules.

ART. 11 RULES FOR THE FINAL EXAMINATION

- **Characteristics of the final examination**

The final assessment of the student's performance consists in the redaction and defence of an original thesis on a topic coherent with the learning outcomes of the Degree Programme, under supervision of a University teacher.

The final examination can also be linked to a learning project or an internship.

The dissertation must demonstrate the student's knowledge in the field of study, her/his judgement skills, competency for making decisions and good communication skills.

- **Final examination criteria**

The final examination consists in a presentation of the scientific results described in the student's Master thesis and by the following discussion in front of a Final Examination Board.

The Final Examination Board is composed by teachers from the partner University where the final examination is held (Research Host University), including at least one teacher from another Partner University, appointed by the Degree Programme Board. This composition must comply with the guidelines of the University where the final examination is performed.

The Faculty- Student Joint Committee gave a favorable opinion on the consistency of the credits assigned to each teaching activity and its learning outcomes pursuant to Art. 12, par. 3, of Ministerial Decree 270/04.

Anno Accademico 2024/2025
Scuola Scienze
Classe LM-54-SCIENZE CHIMICHE
Corso 5701-CHEMICAL INNOVATION AND REGULATION

Primo Anno di Corso

Gruppo: Group of choice 01 - Design

TAF: B Ambito: 1237 - Discipline chimiche organiche

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94259 - 0 - ALTERNATIVE PHARMACEUTICAL PRODUCTS DESIGN		CHIM/06		6	36/0/0/0	No	Voto
<p>Ambito: 1237 - Discipline chimiche organiche</p> <p>Obiettivi: "Learning Objectives: At the end of the course the student will know the problems of discovering and designing new pharmaceutically active substances. She/he will also be aware of alternative chemical products to problematic existing ones and of the use of principles of Green Chemistry for designing and discovering them. He will know how to apply computational tools for the forecast of the bio-pharmacological and environmental properties of new chemicals. The student is expected to be able to: 1. Design and discover new drugs; 2. Design new environmentally friendly chemical products applying the principles of green chemistry; 3. Use the tools of QSAR for the forecast of the properties of new drugs"</p> <p>Obiettivi inglese: "Learning Objectives: At the end of the course the student will know the problems of discovering and designing new pharmaceutically active substances. She/he will also be aware of alternative chemical products to problematic existing ones and of the use of principles of Green Chemistry for designing and discovering them. He will know how to apply computational tools for the forecast of the bio-pharmacological and environmental properties of new chemicals. The student is expected to be able to: 1. Design and discover new drugs; 2. Design new environmentally friendly chemical products applying the principles of green chemistry; 3. Use the tools of QSAR for the forecast of the properties of new drugs"</p>							
5701 000 000 94258 - 0 - APPLIED NEW PRODUCTS		CHIM/06		6	36/0/0/0	No	Voto
<p>Ambito: 1237 - Discipline chimiche organiche</p> <p>Obiettivi: Learning Objectives: At the end of the course the student will be aware of the potential application of new chemical products in many crucial fields. The student will know the properties materials, including new materials as:of colloidal materials, of polymeric substances, of liquid crystals and how to assess the features of these materials. He/she will be able to apply the knowledge acquired to food industry and food assessment. He/she will be aware of the different formulations of chemical substances. The student is expected to be able to: 1. design new products for specific applications; 2. design suitable formulations of chemicals for specific applications; 3. apply new products and formulations to food industry.</p> <p>Obiettivi inglese: Learning Objectives: At the end of the course the student will be aware of the potential application of new chemical products in many crucial fields. The student will know the properties materials, including new materials as:of colloidal materials, of polymeric substances, of liquid crystals and how to assess the features of these materials. He/she will be able to apply the knowledge acquired to food industry and</p>							

food assessment. He/she will be aware of the different formulations of chemical substances. The student is expected to be able to: 1. design new products for specific applications; 2. design suitable formulations of chemicals for specific applications; 3. apply new products and formulations to food industry.

5701 000 000 94257 - 0 - INNOVATIVE PRODUCTS DESIGN

CHIM/06

6

36/0/0/0

No

Voto

Ambito: 1237 - Discipline chimiche organiche

B

Obiettivi: Learning Objectives: At the end of the course the student will be aware of the need of finding alternative chemical products to problematic existing ones and of the use of principles of Green Chemistry for designing and discovering them. He will know how to use computational approaches for designing new alternative chemicals and forecasting their properties. He/she will be aware of the different formulations of chemical substances.

The student is expected to be able to: 1. Design new environmentally friendly chemical products applying the principles of green chemistry; 2. Use the principles of structure-properties relationship for designing new products and forecasting their properties; 3. Design formulations for a specific purpose.

Obiettivi inglese: Learning Objectives: At the end of the course the student will be aware of the need of finding alternative chemical products to problematic existing ones and of the use of principles of Green Chemistry for designing and discovering them. He will know how to use computational approaches for designing new alternative chemicals and forecasting their properties. He/she will be aware of the different formulations of chemical substances.

The student is expected to be able to: 1. Design new environmentally friendly chemical products applying the principles of green chemistry; 2. Use the principles of structure-properties relationship for designing new products and forecasting their properties; 3. Design formulations for a specific purpose.

Gruppo: Group of choice 02 - Industry

TAF: B Ambito: 1237 - Discipline chimiche organiche

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
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5701 000 000 72838 - 0 - INDUSTRIAL INNOVATION

CHIM/06

6

36/0/0/0

No

Voto

Ambito: 1237 - Discipline chimiche organiche

B

Obiettivi: At the end of the course the student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process exploiting Green metrics. The student will become able to apply the knowledge achieved to the problems of chemical industry. A special attention will be devoted to the emerging field of Nanotechnology, also in the light of regulatory constraints.

Obiettivi inglese: At the end of the course the student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process exploiting Green metrics. The student will become able to apply the knowledge achieved to the problems of chemical industry. A special attention will be devoted to the emerging field of Nanotechnology, also in the light of regulatory constraints.

5701 000 000 94266 - 0 - NANOTECH INDUSTRY

CHIM/06

6

36/0/0/0

No

Voto

Ambito: 1237 - Discipline chimiche organiche

B

Obiettivi: At the end of the course the student will know the important innovations ongoing in industries aimed to the production and exploitation of nanomaterials. He/she will become skilled in the techniques available for the challenging characterization of nanomaterials and on the possible threats they pose on health and safety of humans and the environment. The student is expected to be able to: 1. propose innovative solutions for the obtaining of nanomaterial; 2. find innovative application to nanosized materials and find correct applications of nanomaterials for specific problems

Obiettivi inglese: At the end of the course the student will know the important innovations ongoing in industries aimed to the production and exploitation of nanomaterials. He/she will become skilled in the techniques available for the challenging characterization of nanomaterials and on the possible threats they pose on health and safety of humans and the environment. The student is expected to be able to: 1. propose innovative solutions for the obtaining of nanomaterial; 2. find innovative application to nanosized materials and find correct applications of nanomaterials for specific problems

5701 000 000 94265 - 0 - SUSTAINABLE PHARMA INDUSTRY

CHIM/06

6

36/0/0/0

No

Voto

Ambito: 1237 - Discipline chimiche organiche

B

Obiettivi: At the end of the course the student will be aware of the concerns for the scientific, economic, environmental and social sustainability of pharmaceutical and fine chemicals industries. The crucial issue of patenting and protection of intellectual property rights and the necessity of industrial forgery detection in the context of fine chemicals and pharmaceutical industry will constitute the framework within acquired knowledge can be applied. The student is expected to be able to: 1. assess the sustainability of the chemical and pharmaceutical industrial productions; 2. take care of the IPR and patenting issues in chemical industries; take care of the issues related to industrial forgery

Obiettivi inglese: At the end of the course the student will be aware of the concerns for the scientific, economic, environmental and social sustainability of pharmaceutical and fine chemicals industries. The crucial issue of patenting and protection of intellectual property rights and the necessity of industrial forgery detection in the context of fine chemicals and pharmaceutical industry will constitute the framework within acquired knowledge can be applied. The student is expected to be able to: 1. assess the sustainability of the chemical and pharmaceutical industrial productions; 2. take care of the IPR and patenting issues in chemical industries; take care of the issues related to industrial forgery

Gruppo: Group of choice 03 - Management**TAF: C Ambito: 1144 - Attività formative affini o integrative****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94264 - 0 - BUSINESS AND ENTERPRISE		SECS-P/06		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative			C				
Obiettivi: At the end of the course the student will know how to manage innovation and sustainability in the chemical business. The student will learn the guidelines of entrepreneurship and will become familiar with the problems to be faced and solutions found when starting a new enterprise. He/she will become skilled in performing business plan activities for boosting innovation in chemical industry. The student is expected to be able to: 1. manage innovation issues in chemical industries; 2. contribute to prepare and manage a business plan; 3. foster the establishment of new enterprises.							
Obiettivi inglese: At the end of the course the student will know how to manage innovation and sustainability in the chemical business. The student will learn the guidelines of entrepreneurship and will become familiar with the problems to be faced and solutions found when starting a new enterprise. He/she will become skilled in performing business plan activities for boosting innovation in chemical industry. The student is expected to be able to: 1. manage innovation issues in chemical industries; 2. contribute to prepare and manage a business plan; 3. foster the establishment of new enterprises.							
5701 000 000 94268 - 0 - BUSINESS AND MARKETING		SECS-P/06		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative			C				
Obiettivi: At the end of the course the student will be aware of the economic and management issues underlying industrial innovation. The student will know the relevance of quality management. She/he will learn how to understand a business plan. At the end of the course, the students will be able to: 1. to address and understand market researches; 2. to perform and understand a quality assessment according to the most important international standards; 3. performing business plan activities.							
Obiettivi inglese: At the end of the course the student will be aware of the economic and management issues underlying industrial innovation. The student will know the relevance of quality management. She/he will learn how to understand a business plan. At the end of the course, the students will be able to: 1. to address and understand market researches; 2. to perform and understand a quality assessment according to the most important international standards; 3. performing business plan activities.							
5701 000 000 94267 - 0 - QUALITY AND INNOVATION		SECS-P/06		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative			C				
Obiettivi: At the end of the course the student will be aware of the importance of quality management and will know the concepts of quality assurance and quality control. She/he will learn how to manage the innovation in complex organization and how to boost innovation process. At the end of the course, the students will be able to address and understand market researches. The student is expected to be able to: 1. perform and understand a quality assessment according to the most important international standards; 2. contribute to design, perform and exploit a market research; 3. fulfill the requirements of quality standards and foster the application of quality in laboratory and industry.							
Obiettivi inglese: At the end of the course the student will be aware of the importance of quality management and will know the concepts of quality assurance and quality control. She/he will learn how to manage the innovation in complex organization and how to boost innovation process. At the end of the course, the students will be able to address and understand market researches. The student is expected to be able to: 1. perform and understand a quality assessment according to the most important international standards; 2. contribute to design, perform and exploit a market research; 3. fulfill the requirements of quality standards and foster the application of quality in laboratory and industry.							

Gruppo: Group of choice 04 - Chemical Sustainability**TAF: B Ambito: 1237 - Discipline chimiche organiche****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94269 - 0 - CHEMICAL SUSTAINABILITY		CHIM/06		6	36/0/0/0	No	Voto
Ambito: 1237 - Discipline chimiche organiche B Obiettivi: At the end of the course the student will be aware of the outstanding issue of chemical sustainability. She/he will know how to exploit renewable sources of raw materials. The student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process, exploiting Green metrics. The student will be aware of the concerns for health and the environment that the industrial use and production of solvents raises, and of the alternative safer solvents that are available nowadays and the principles for designing new ones. The student is will be able to: 1. assess the "greenes" of chemical processes using internationally accepted metrics; 2. design and propose chemical products and processes base on renewable feedstocks; 3. propose the use of benign solvents in place of traditional problematic ones. Obiettivi inglese: At the end of the course the student will be aware of the outstanding issue of chemical sustainability. She/he will know how to exploit renewable sources of raw materials. The student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process, exploiting Green metrics. The student will be aware of the concerns for health and the environment that the industrial use and production of solvents raises, and of the alternative safer solvents that are available nowadays and the principles for designing new ones. The student is will be able to: 1. assess the "greenes" of chemical processes using internationally accepted metrics; 2. design and propose chemical products and processes base on renewable feedstocks; 3. propose the use of benign solvents in place of traditional problematic ones.							
5701 000 000 94270 - 0 - CHEMISTRY FROM NATURE		CHIM/06		6	36/0/0/0	No	Voto
Ambito: 1237 - Discipline chimiche organiche B Obiettivi: At the end of the course the student will be aware that natural processes and natural products are sources of materials and inspiration for implementing green chemical production and products exploitation. Biocatalytic processes and green solvents will be chosen as examples of important tools to be applied in the development of new chemicals and in their production. The student is expected to be able to: 1. design synthetic routes to chemicla products that resembles metabolic pathways and exploit enzymes and fermentations; 2. design synthetic routes that exploit biomass-derived products as starting materials; 3. design chemical synthese and manipulations processes that exploit biomass-derived solvents as liquid media; Obiettivi inglese: At the end of the course the student will be aware that natural processes and natural products are sources of materials and inspiration for implementing green chemical production and products exploitation. Biocatalytic processes and green solvents will be chosen as examples of important tools to be applied in the development of new chemicals and in their production. The student is expected to be able to: 1. design synthetic routes to chemicla products that resembles metabolic pathways and exploit enzymes and fermentations; 2. design synthetic routes that exploit biomass-derived products as starting materials; 3. design chemical synthese and manipulations processes that exploit biomass-derived solvents as liquid media;							
5701 000 000 46072 - 0 - GREEN CHEMISTRY		CHIM/06		6	36/0/0/0	No	Voto
Ambito: 1237 - Discipline chimiche organiche B Obiettivi: At the end of the course the student will be aware of the strategy of Green chemistry as main guideline to sustainable development in the chemical field. The student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process, exploiting Green metrics. The student will learn some innovative green synthetic strategies and protocols safe reagents and catalysts. Among others, biocatalytic processes will be chosen as examples of important tools to be applied in the development of new chemicals and in their production. The student is expected to be able to: 1. design innovative synthetic routes and exploit alternative and benign reagents and catalysts; 2. design synthetic route tha explooit enzymes and microorganisms in place of chemicla reagents and catalysts; 3. assess the greenness of the proposed processes. Obiettivi inglese: At the end of the course the student will be aware of the strategy of Green chemistry as main guideline to sustainable development in the chemical field. The student will know the principles and tool of Green Chemistry and how to assess the greenness of a chemical process, exploiting Green metrics. The student will learn some innovative green synthetic strategies and protocols safe reagents and catalysts. Among others, biocatalytic processes will be chosen as examples of important tools to be applied in the development of new chemicals and in their production. The student is expected to be able to: 1. design innovative synthetic routes and exploit alternative and benign reagents and catalysts; 2. design synthetic route tha explooit enzymes and microorganisms in place of chemicla reagents and catalysts; 3. assess the greenness of the proposed processes.							

Gruppo: Group of choice 05 - Circular Economy**TAF: B Ambito: 351 - Discipline chimiche industriali****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94273 - 0 - Circular Economy		CHIM/04		6	36/0/0/0	No	Voto
Ambito: 351 - Discipline chimiche industriali Obiettivi: At the end of the course the student will be aware that Circular economy is one of the key strategies for sustainability. The student will know of the problem of scarcity of resources and raw materials. The student will learn the most important methodology to recycle waste materials. She/he will be able to use Life Cycle Assessment as most important tool for general and environmental evaluation of chemicals in the perspective of circular economy. At the end of the course the student will be able: 1. to propose solutions that foster the circular economy in the chemical and related sectors exploiting recycling and reuse as the main tools; 2. to assess the criticality of supply of certain raw materials and to propose alternatives and/or best practices for their use; 3. to exploit the instruments of LCA for the assessment of improvements achievable through the implementation of circular economy. Obiettivi inglese: At the end of the course the student will be aware that Circular economy is one of the key strategies for sustainability. The student will know of the problem of scarcity of resources and raw materials. The student will learn the most important methodology to recycle waste materials. She/he will be able to use Life Cycle Assessment as most important tool for general and environmental evaluation of chemicals in the perspective of circular economy. At the end of the course the student will be able: 1. to propose solutions that foster the circular economy in the chemical and related sectors exploiting recycling and reuse as the main tools; 2. to assess the criticality of supply of certain raw materials and to propose alternatives and/or best practices for their use; 3. to exploit the instruments of LCA for the assessment of improvements achievable through the implementation of circular economy.							
5701 000 000 94274 - 0 - RAW MATERIALS		CHIM/04		6	36/0/0/0	No	Voto
Ambito: 351 - Discipline chimiche industriali Obiettivi: At the end of the course the student will be aware of the criticality of feedstock supply of some raw materials, both organic or inorganic. The student will know how to design new products and processes for the improvement of recyclability and reuse. She/he will be able to use Life Cycle Assessment as most important tool for general and environmental evaluation of chemicals in the perspective of circular economy. The student is expected to be able to: 1. contribute to design products and processes that are intrinsically suitable for a smart recycling of the components and materials; 2. to propose alternatives to the critical raw materials now in great use, or improve their recycle; 3. to exploit the instruments of LCA for the assessment of improvements achievable. Obiettivi inglese: At the end of the course the student will be aware of the criticality of feedstock supply of some raw materials, both organic or inorganic. The student will know how to design new products and processes for the improvement of recyclability and reuse. She/he will be able to use Life Cycle Assessment as most important tool for general and environmental evaluation of chemicals in the perspective of circular economy. The student is expected to be able to: 1. contribute to design products and processes that are intrinsically suitable for a smart recycling of the components and materials; 2. to propose alternatives to the critical raw materials now in great use, or improve their recycle; 3. to exploit the instruments of LCA for the assessment of improvements achievable.							
5701 000 000 64842 - 0 - WASTE MANAGEMENT		CHIM/04		6	36/0/0/0	No	Voto
Ambito: 351 - Discipline chimiche industriali Obiettivi: At the end of the course the student will be aware of the social and regulative problematic of management of waste materials and of their disposal. She/he will know the most important methodologies to reuse products at their end of life and to recycle waste materials. The student will be aware of the principal methodologies to treat and reuse waste waters. The student is expected to be able to: propose recycling and reuse of waste materials from both industrial and generic origin; 2. propose good solution for the treatment of waste waters in the perspective of their reuse; 3. assess the respect by the processes implemented of waste materials regulations Obiettivi inglese: At the end of the course the student will be aware of the social and regulative problematic of management of waste materials and of their disposal. She/he will know the most important methodologies to reuse products at their end of life and to recycle waste materials. The student will be aware of the principal methodologies to treat and reuse waste waters. The student is expected to be able to: propose recycling and reuse of waste materials from both industrial and generic origin; 2. propose good solution for the treatment of waste waters in the perspective of their reuse; 3. assess the respect by the processes implemented of waste materials regulations							

Gruppo: Group of choice 06 - Toxicology**TAF: B Ambito: 339 - Discipline biochimiche****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
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5701 000 000 94276 - 0 - HUMAN TOXICOLOGY	BIO/10	6	36/0/0/0	No	Voto
Ambito: 339 - Discipline biochimiche B Obiettivi: At the end of the course the student will acquire knowledge of basis and human toxicology and of the evaluation of toxicity of chemical substances towards men. The student is expected to be able to: 1. assess genotoxicity of a chemical substance; 2. assess the persistence and excretion of chemicals in the human body. Obiettivi inglese: At the end of the course the student will acquire knowledge of basis and human toxicology and of the evaluation of toxicity of chemical substances towards men. The student is expected to be able to: 1. assess genotoxicity of a chemical substance; 2. assess the persistence and excretion of chemicals in the human body.					
5701 000 000 97497 - 0 - TOXICOLOGICAL ASSESSMENT	BIO/10	6	36/0/0/0	No	Voto
Ambito: 339 - Discipline biochimiche B Obiettivi: At the end of the course the student will acquire knowledge of the methods for evaluation of toxicity of chemical substances and of the toxicological risk associated with them. She/he will become familiar with the principles for biosafety. The student is expected to be able to: 1. predict the risk of a chemical substance to impact on the genome of organisms; 2. to contribute to the safety of plants and instrumentation possessing a biological risk. Obiettivi inglese: At the end of the course the student will acquire knowledge of the methods for evaluation of toxicity of chemical substances and of the toxicological risk associated with them. She/he will become familiar with the principles for biosafety. The student is expected to be able to: 1. predict the risk of a chemical substance to impact on the genome of organisms; 2. to contribute to the safety of plants and instrumentation possessing a biological risk.					
5701 000 000 94275 - 0 - TOXICOLOGICAL PERSPECTIVE	BIO/10	6	36/0/0/0	No	Voto
Ambito: 339 - Discipline biochimiche B Obiettivi: At the end of the course the student will acquire knowledge of the basis of human and environmental toxicology. The student will know the most appropriate analytical techniques for assessing human and environmental toxicity of chemicals. The student is expected to be able to: 1. assess a chemical substance from a toxicological point of view; 2. apply the most appropriate technique for the toxicological evaluation of chemical substances. Obiettivi inglese: At the end of the course the student will acquire knowledge of the basis of human and environmental toxicology. The student will know the most appropriate analytical techniques for assessing human and environmental toxicity of chemicals. The student is expected to be able to: 1. assess a chemical substance from a toxicological point of view; 2. apply the most appropriate technique for the toxicological evaluation of chemical substances.					

Gruppo: Group of choice 07 - Environmental Sustainability**TAF: B Ambito: 1238 - Discipline chimiche analitiche e****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 72842 - 0 - ENVIRONMENTAL ASSESSMENT	CHIM/12	6	36/0/0/0	No	Voto		
Ambito: 1238 - Discipline chimiche analitiche e ambientali B Obiettivi: At the end of the course the student be aware of the crucial role of assessment (chemical, toxicological, physical) for protection of the environment. A special focus will be posed to the detection of plastic materials and to the evaluation of the threat that these persistent pollutant make to the different environments. The student is expected to be able to: 1. propose the most suitable methods to assess environmental quality and will be skilled in the interpretation of the results obtained; 2. predict the processes and velocity of transformation that pollutants undergo in the environment and forecast their fate and impact. Obiettivi inglese: At the end of the course the student be aware of the crucial role of assessment (chemical, toxicological, physical) for protection of the environment. A special focus will be posed to the detection of plastic materials and to the evaluation of the threat that these persistent pollutant make to the different environments. The student is expected to be able to: 1. propose the most suitable methods to assess environmental quality and will be skilled in the interpretation of the results obtained; 2. predict the processes and velocity of transformation that pollutants undergo in the environment and forecast their fate and impact.							

5701 000 000 94277 - 0 - ENVIRONMENTAL SUSTAINABILITY

CHIM/12

6

36/0/0/0

No

Voto

Ambito: 1238 - Discipline chimiche analitiche e ambientali

B

Obiettivi: At the end of the course the student will be aware of the central role of sustainability perspective for the protection and the management of environment. The student will know the relationship between physico-chemical features of substances, their transformation in the environment and their environmental impact. She/he will become aware of the peculiar environmental impact posed by plastic materials. The student is expected to be able to: 1. predict and assess the environmental fate and the modalities of transformation of chemicals; 2. propose and implement methodologies to reduce and remediate the chemical pollution; 3. propose solutions to prevent and reduce pollution from plastic materials.

Obiettivi inglese: At the end of the course the student will be aware of the central role of sustainability perspective for the protection and the management of environment. The student will know the relationship between physico-chemical features of substances, their transformation in the environment and their environmental impact. She/he will become aware of the peculiar environmental impact posed by plastic materials. The student is expected to be able to: 1. predict and assess the environmental fate and the modalities of transformation of chemicals; 2. propose and implement methodologies to reduce and remediate the chemical pollution; 3. propose solutions to prevent and reduce pollution from plastic materials.

5701 000 000 94278 - 0 - GLOBAL CONCERNS

CHIM/12

6

36/0/0/0

No

Voto

Ambito: 1238 - Discipline chimiche analitiche e ambientali

B

Obiettivi: At the end of the course the student will become familiar the concept of global environmental changes, with a special focus on climatic changes. The student will be aware of the threat posed by global changes to mankind and the environment. He/she will be aware of the international agreements for protection of the global environment and reduction of the impact of global changes (Montreal, Rio de Janeiro, Kyoto, Paris and others). The full comprehension of global changes is inherently linked to the transformation of chemical substance in the environment (atmosphere, waterbodies, sediments and soil); the student will become aware of all these aspects. The student will be able to: 1. comprehend and foresee the effect of antropogenic emissions on global changes; 2. compare the guidelines and recommendation of the international agreements with the local and global trends; 3. predict the effects on global pollution of the process of environmental transformations and compartmentation of pollutants.

Obiettivi inglese: At the end of the course the student will become familiar the concept of global environmental changes, with a special focus on climatic changes. The student will be aware of the threat posed by global changes to mankind and the environment. He/she will be aware of the international agreements for protection of the global environment and reduction of the impact of global changes (Montreal, Rio de Janeiro, Kyoto, Paris and others). The full comprehension of global changes is inherently linked to the transformation of chemical substance in the environment (atmosphere, waterbodies, sediments and soil); the student will become aware of all these aspects. The student will be able to: 1. comprehend and foresee the effect of antropogenic emissions on global changes; 2. compare the guidelines and recommendation of the international agreements with the local and global trends; 3. predict the effects on global pollution of the process of environmental transformations and compartmentation of pollutants.

Gruppo: Group of choice 08 - Assessment**TAF: B Ambito: 1238 - Discipline chimiche analitiche e****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94280 - 0 - DATA MANAGEMENT	CHIM/01			6	36/0/0/0	No	Voto
Ambito: 1238 - Discipline chimiche analitiche e ambientali							
Obiettivi: At the end of the course the student will be aware of the importance to manage data sets for an efficient chemical assessment. The student is expected to be able to: 1. use statistical methods to validate analytical data and to find out correlation and trends; 2. identify the best experimental framework for an efficient data collection; 3. manage large dataset.							
Obiettivi inglese: At the end of the course the student will be aware of the importance to manage data sets for an efficient chemical assessment. The student is expected to be able to: 1. use statistical methods to validate analytical data and to find out correlation and trends; 2. identify the best experimental framework for an efficient data collection; 3. manage large dataset.							
5701 000 000 94279 - 0 - GENERAL ASSESSMENT	CHIM/01			6	36/0/0/0	No	Voto
Ambito: 1238 - Discipline chimiche analitiche e ambientali							
Obiettivi: At the end of the course the student will be aware of the central role of experimental assessment for chemical innovation of for the effective application of chemical regulation. The student will acquire a knowledge of reference materials and procedures for best laboratory assessment. She/he will know the statistical parameters that characterize the uncertainty of analytical data. The student will be able to; 1. assess the uncertainty of analytical data exploiting statistical methods; 2. manage experimental complexity; 3. design the most correct choice of parameters and condition to perform efficiently the experimental workload.							
Obiettivi inglese: At the end of the course the student will be aware of the central role of experimental assessment for chemical innovation of for the effective application of chemical regulation. The student will acquire a knowledge of reference materials and procedures for best laboratory assessment. She/he will know the statistical parameters that characterize the uncertainty of analytical data. The student will be able to; 1. assess the uncertainty of analytical data exploiting statistical methods; 2. manage experimental complexity; 3. design the most correct choice of parameters and condition to perform efficiently the experimental workload.							

5701 000 000 94281 - 0 - LABORATORY ASSESSMENT

CHIM/01

6

36/0/0/0

No

Voto

Ambito: 1238 - Discipline chimiche analitiche e ambientali

B

Obiettivi: At the end of the course the student will be aware of the relevance of laboratory analysis and assessment. The student will acquire a knowledge of reference materials and procedures for best laboratory assessment. In order to make data valid for general purposes, the student will become aware of the GLP (Good Laboratory Practice) regulation. The student in will be able to: 1. statistically elaborate analytical data; 2. set and maintain conditions to comply with GLP requirements; 3. perform laboratory intercomparison and manage reference testing materials.

Obiettivi inglese: At the end of the course the student will be aware of the relevance of laboratory analysis and assessment. The student will acquire a knowledge of reference materials and procedures for best laboratory assessment. In order to make data valid for general purposes, the student will become aware of the GLP (Good Laboratory Practice) regulation. The student in will be able to: 1. statistically elaborate analytical data; 2. set and maintain conditions to comply with GLP requirements; 3. perform laboratory intercomparison and manage reference testing materials.

Gruppo: Group of choice 09 - Risk and Safety**TAF: B Ambito: 1236 - Discipline chimiche inorganiche e****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa**TIP****SSD****TAF****CFU****ORE F/E/L/N****FREQ. VER.**

5701 000 000 94284 - 0 - CHEMICAL PLANTS SAFETY

CHIM/02

6

36/0/0/0

No

Voto

Ambito: 1236 - Discipline chimiche inorganiche e chimico-fisiche

B

Obiettivi: At the end of the course the student will be aware of the peculiar risk of chemical plants and of the great impact they could represent. The student will know the aspects of chemical risk and the best practices for its assessment and management. The student is expected to be able to: 1. assess the hazard deriving for chemical reactions; 2. implement the procedures for design and maintenance of safety in industrial chemical processes; 3. manage the risk deriving from industrial chemical plants.

Obiettivi inglese: At the end of the course the student will be aware of the peculiar risk of chemical plants and of the great impact they could represent. The student will know the aspects of chemical risk and the best practices for its assessment and management. The student is expected to be able to: 1. assess the hazard deriving for chemical reactions; 2. implement the procedures for design and maintenance of safety in industrial chemical processes; 3. manage the risk deriving from industrial chemical plants.

5701 000 000 94283 - 0 - CHEMICAL SAFETY

CHIM/02

6

36/0/0/0

No

Voto

Ambito: 1236 - Discipline chimiche inorganiche e chimico-fisiche

B

Obiettivi: At the end of the course the student will be aware of the outstanding importance of safe production and exploitation of chemical substances. She/he will know the relationship between physico-chemical behaviour of substances and the hazard they pose, in particular when those substances undergo chemical reactions. The student will be aware that issues of safety and risk associated with chemical substances and processes have strongly impaired the social reputation of chemistry. The student will be able to: 1. assess the hazard of chemical laboratories and plants; 2. implement best practice to maintain laboratories and plants in a safe condition; 3. perform the correct communication of the importance of chemistry and promote a correct perception of the risk associated with it.

Obiettivi inglese: At the end of the course the student will be aware of the outstanding importance of safe production and exploitation of chemical substances. She/he will know the relationship between physico-chemical behaviour of substances and the hazard they pose, in particular when those substances undergo chemical reactions. The student will be aware that issues of safety and risk associated with chemical substances and processes have strongly impaired the social reputation of chemistry. The student will be able to: 1. assess the hazard of chemical laboratories and plants; 2. implement best practice to maintain laboratories and plants in a safe condition; 3. perform the correct communication of the importance of chemistry and promote a correct perception of the risk associated with it.

5701 000 000 97498 - 0 - RISK AND SAFETY

CHIM/02

6

36/0/0/0

No

Voto

Ambito: 1236 - Discipline chimiche inorganiche e chimico-fisiche

B

Obiettivi: At the end of the course the student will be aware of the chemical risk and of the best practices for its assessment and management. She/he will know the most critical hazards of chemical substances for the health and the safety of people and for promotion of a healthy and safe production and use of chemicals. The student will be able to: 1. evaluate the chemical safe and health procedures in laboratory and industry; 2. implement a correct and benign relationship between producers and customers; 3. propose solutions for an efficient management of the chemical risk.

Obiettivi inglese: At the end of the course the student will be aware of the chemical risk and of the best practices for its assessment and management. She/he will know the most critical hazards of chemical substances for the health and the safety of people and for promotion of a healthy and safe production and use of chemicals. The student will be able to: 1. evaluate the chemical safe and health procedures in laboratory and industry; 2. implement a correct and benign relationship between producers and customers; 3. propose solutions for an efficient management of the chemical risk.

Gruppo: Group of choice 10 - Regulation**TAF: C Ambito: 1144 - Attività formative affini o integrative****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 94285 - 0 - CHEMICAL REGULATION		IUS/10		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative Obiettivi: At the end of the course the student will be aware of the necessity to regulate the production and use of chemical substances. The student will know the most important EU and non-EU regulations regarding all the types of chemical substances. The student will be particularly familiar with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), but he will also know the American TSCA, the Japanese CSCL (Chemical Substances Control Law) and regulations of China and Brazil. A special focus will be put on substances having peculiar regulations like biocides and pesticides. The student will be able to: 1. manage the issues of REACH registration and compliance; 2. compare the requirements and constraints of REACH and other international regulations; 3. comply with the regulation of biocides and pesticides. Obiettivi inglese: At the end of the course the student will be aware of the necessity to regulate the production and use of chemical substances. The student will know the most important EU and non-EU regulations regarding all the types of chemical substances. The student will be particularly familiar with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), but he will also know the American TSCA, the Japanese CSCL (Chemical Substances Control Law) and regulations of China and Brazil. A special focus will be put on substances having peculiar regulations like biocides and pesticides. The student will be able to: 1. manage the issues of REACH registration and compliance; 2. compare the requirements and constraints of REACH and other international regulations; 3. comply with the regulation of biocides and pesticides.							
5701 000 000 94286 - 0 - FOOD AND DRUGS REGULATIONS		IUS/10		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative Obiettivi: At the end of the course the student will be aware of chemical regulation and in particular with regulation in the food and pharmaceutical fields. The student will become familiar with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemicals). A special focus will be put on substances having peculiar regulations like foods and pharmaceutical active substances. The student is expected to be able to: 1. comply with REACH regulation and with CLP labelling; 2. comply with the regulations concerning the use of chemicals in the food industry; 3. comply with regulations in the pharmaceutical industry Obiettivi inglese: At the end of the course the student will be aware of chemical regulation and in particular with regulation in the food and pharmaceutical fields. The student will become familiar with the European REACH (Registration, Evaluation, Authorization and Restriction of Chemicals). A special focus will be put on substances having peculiar regulations like foods and pharmaceutical active substances. The student is expected to be able to: 1. comply with REACH regulation and with CLP labelling; 2. comply with the regulations concerning the use of chemicals in the food industry; 3. comply with regulations in the pharmaceutical industry							
5701 000 000 97496 - 0 - REGULATION AND NANOTECH		IUS/10		6	36/0/0/0	No	Voto
Ambito: 1144 - Attività formative affini o integrative Obiettivi: At the end of the course the student will be aware of chemical regulation and in particular with the challenging issue of regulation of nanomaterials. the student will become familiar with the European REACH (Registration, Evaluation and Authorization of Chemicals). He/she will also know criticality of regulations related to nanomaterials and nanotechnology that represent a rapidly growing innovation topic. Application of nanotechnology in the medical and pharmaceutical field is strongly increasing. For this reason, the student will put a special focus on pharmaceutical regulations. The student is expected to be able to: 1. comply with REACH regulation and with CLP labelling; 2. manage issues related to nanomaterials regulation; 3. manage the issues related to the use of nanomaterials in the pharmaceutical and related fields. Obiettivi inglese: At the end of the course the student will be aware of chemical regulation and in particular with the challenging issue of regulation of nanomaterials. the student will become familiar with the European REACH (Registration, Evaluation and Authorization of Chemicals). He/she will also know criticality of regulations related to nanomaterials and nanotechnology that represent a rapidly growing innovation topic. Application of nanotechnology in the medical and pharmaceutical field is strongly increasing. For this reason, the student will put a special focus on pharmaceutical regulations. The student is expected to be able to: 1. comply with REACH regulation and with CLP labelling; 2. manage issues related to nanomaterials regulation; 3. manage the issues related to the use of nanomaterials in the pharmaceutical and related fields.							

Gruppo: Group of choice 11 - Transferable skills**TAF: F Ambito: 1146 - Tirocini formativi e di orientamento****Cfu min: 6 Cfu max: 6**

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
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5701 000 000 94288 - 0 - COMMUNICATION ATTITUDE	6	32/0/16/0	No	Voto
F				
Ambito: Obiettivi: At the end of the activity, in order to improve communication skills, the student will gain basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) where she/he is attending classes. The student will also be trained in some important tools for communication of concepts and results. The acquired skills will be useful for collaborative work and the student will be aware of the good practice for building working teams.				
Obiettivi inglese: At the end of the activity, in order to improve communication skills, the student will gain basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) where she/he is attending classes. The student will also be trained in some important tools for communication of concepts and results. The acquired skills will be useful for collaborative work and the student will be aware of the good practice for building working teams.				
5701 000 000 94291 - 0 - INNOVATION ATTITUDE	6	32/0/16/0	No	Voto
F				
Ambito: Obiettivi: At the end of the activity, the student will be aware of the role of research, as the motor of innovation and of innovation as the main goal for fostering sustainable development and well-being improvement. Since collaborative work is the major tool for scientific research, the student will be aware of the good practice for building working teams. To these aims, the basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) will be improved.				
Obiettivi inglese: At the end of the activity, the student will be aware of the role of research, as the motor of innovation and of innovation as the main goal for fostering sustainable development and well-being improvement. Since collaborative work is the major tool for scientific research, the student will be aware of the good practice for building working teams. To these aims, the basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) will be improved.				
5701 000 000 94289 - 0 - IT SKILLS	6	32/0/16/0	No	Voto
F				
Ambito: Obiettivi: At the end of the activity the student will be aware of the most important IT tools useful to manage, elaborate, present and communicate scientific data. Communication capability will be further improved gaining basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan). The acquired IT skills will find exploitation in training for preparation of research projects and in retrieval of scientific information.				
Obiettivi inglese: At the end of the activity the student will be aware of the most important IT tools useful to manage, elaborate, present and communicate scientific data. Communication capability will be further improved gaining basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan). The acquired IT skills will find exploitation in training for preparation of research projects and in retrieval of scientific information.				
5701 000 000 94290 - 0 - RESEARCH ATTITUDE	6	32/0/16/0	No	Voto
F				
Ambito: Obiettivi: At the end of the activity, in order to improve his/her skills as researcher, the student will gain basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) where she/he is attending classes. The student will become skilled in practical laboratory experimentation and will be aware of the structure and features of research projects and in retrieval of scientific information.				
Obiettivi inglese: At the end of the activity, in order to improve his/her skills as researcher, the student will gain basic knowledge of the national language (Italian, Portuguese, Spanish or Catalan) where she/he is attending classes. The student will become skilled in practical laboratory experimentation and will be aware of the structure and features of research projects and in retrieval of scientific information.				

Secondo Anno di Corso

Gruppo: Free Choice Learning Activities

TAF: D Ambito: 1008 - A scelta dello studente

Cfu min: 9 Cfu max: 9

Num. Esami: 1 Num. Idoneità: 0

La Scuola garantisce che, ai fini del rispetto del limite massimo di 12 esami/5 idoneità i CFU a scelta saranno acquisibili con 1 esami e 0 idoneità

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ. VER.
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5701 000 000 78955 - 0 - LABORATORY TRAINING FOR RESEARCH PROJECT	9	72/0/0/0	No	Voto
Ambito: 1008 - A scelta dello studente	D			
Obiettivi: At the end of the activity the student will be trained to perform research work in the field of Chemical Regulation and Innovation.				
Obiettivi inglese: At the end of the activity the student will be trained to perform research work in the field of Chemical Regulation and Innovation.				

Gruppo: Compulsory Activities

TAF: Ambito:

Cfu min: Cfu max:

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
5701 000 000 86228 - 0 - FINAL EXAMINATION				30	0/0/0/0	No	
Ambito: 1018 - Per la prova finale	E						
Obiettivi: At the end of the activity the student will be able to perform research work in the field of Chemical Regulation and Innovation suitable for the preparation of the final student's dissertation.							
Obiettivi inglese: At the end of the activity the student will be able to perform research work in the field of Chemical Regulation and Innovation suitable for the preparation of the final student's dissertation.							
5701 000 000 60749 - 0 - INTERNSHIP				15	0/0/375/0	No	Voto
Ambito: 1146 - Tirocini formativi e di orientamento	F						
Obiettivi: At the end of the activity the student will gain knowledge and familiarity with the methods and procedures of the world of work and production							
Obiettivi inglese: At the end of the activity the student will gain knowledge and familiarity with the methods and procedures of the world of work and production							

Legenda:

CFU: crediti formativi universitari

TAF: tipologia attività formativa (A-di base; B-caratterizzanti; C-affini o integrative; F-ulteriori attività formative; D-a scelta autonoma dello studente; S- stages e tirocini presso imprese, enti pubblici o privati, ordini professionali; E-per la prova finale)

SSD: settore scientifico disciplinare

F/E/L/N: indica le ore Frontali/Esercitazioni/Laboratori/Ore di esercitazione e/o laboratorio tenute da non docenti

Freq.: segnala l'esistenza di un obbligo di frequenza

Ver.: indica la modalità di verifica del profitto finale

TIP.: indica la tipologia delle forme didattiche. Queste possono essere CON: convenzionali, E-L: in e-learning, MIX: miste, C/E: convenzionali e/o e-learning. Il corso di studio può definire annualmente una delle modalità.