ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

REGOLAMENTO DIDATTICO DEL CORSO

LM 54- [CHEMICAL INNOVATION AND REGULATION]

Sede di Bologna

INDICE

Qualora, unicamente a scopo di sintesi, nel presente regolamento sia usata la sola forma maschile, questa è da intendersi riferita in maniera inclusiva a tutte le persone che operano nell'ambito della comunità stessa.

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, di un diploma universitario di durata triennale, o 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 essere in possesso di un 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 (*SSD:* MAT, INF, FIS, BIO, CHIM**,** ING-IND) di cui almeno 25 CFU nei seguenti settori scientifico disciplinari: da CHIM/01 a CHIM/12, 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. La verifica è effettuata secondo le modalità definite nel punto Modalità di ammissione.

- **Modalità di ammissione**

La verifica dell'adeguatezza della personale preparazione effettuata da parte di una Commissione sulle conoscenze e competenze a livello universitario nelle discipline chimiche avverrà ricorrendo all'esame del curriculum del candidato.

La preparazione personale è valutata come adeguata se il candidato raggiunge un punteggio minimo le cui modalità di calcolo sono indicate annualmente nel bando di ammissione.
La verifica della conoscenza dell'inglese avverrà tramite la presentazione di un certificato idoneo, riconosciuto internazionalmente (TOEFL, Cambridge first certificate, ecc.).

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

Lo studente può scegliere tra le attività formative attivate in Ateneo purché coerenti con il percorso formativo. 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

Il riconoscimento dei crediti acquisiti nei precedenti studi universitari è determinato, su istanza dello studente, dal Consiglio di corso di studio.
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.

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

Il riconoscimento dei crediti acquisiti nei precedenti studi universitari è determinato, su istanza dello studente, dal Consiglio di corso di studio.
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.

ART. 9 CRITERI DI RICONOSCIMENTO DELLE CONOSCENZE E ABILITÀ EXTRAUNIVERSITARIE

Possono essere riconosciute competenze acquisite fuori dall'Università nei seguenti casi, previsti dalla normativa vigente.
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 in lingua inglese di una tesi scritta ed elaborata in modo originale dallo studente riguardante il progetto di ricerca svolto nel semestre precedente presso un laboratorio di ricerca accademico o un laboratorio di ricerca industriale sotto la supervisione di un tutor accademico. La tematica di ricerca è coerente con gli obiettivi del corso di studio, sotto la guida di un relatore.

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**

L'attività di preparazione della tesi consiste in un lavoro originale di ricerca sperimentale, teorica o sul campo su temi coerenti con gli obiettivi formativi del Corso di studio.
L'attività può essere svolta in parte presso uno dei Partner associati al progetto.
Un docente delle Università consorziate svolge il ruolo di supervisore.
L'indicazione del supervisore ed il tema oggetto di studio devono essere preventivamente approvati dal Consiglio di Corso di studio e dal Comitato di coordinamento del progetto congiunto.
La tesi di laurea consiste in un elaborato scritto originale in lingua inglese, redatto dallo studente ed approvato dal supervisore.

La Commissione è composta sia da docenti dell'Università di Bologna che da almeno un docente di una delle Università consorziate.

Il voto finale risulta da una media tra le attività di insegnamento realizzate principalmente nel primo anno di corso, le attività di ricerca e preparazione della tesi realizzate nel secondo anno di corso e la discussione della tesi stessa.

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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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In the event that, solely for the sake of brevity, the masculine form is used in this regulation, it is to be understood as inclusive and referring to all individuals operating within the community

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. The assessment will be carried out according to the procedure defined in the paragraph "assessment of personal knowledge".

- **Assessment of personal knowledge**

The assessment of the adequacy of personal knowledge, carried out by an Admission Board on university-level knowledge and skills in chemistry, will be based on the candidate's curriculum review.
Personal preparation is deemed adequate if the candidate achieves a minimum score, with the calculation method specified annually in the admission notice.
English proficiency will be verified through the submission of an internationally recognized certificate (TOEFL, Cambridge First Certificate, etc.). In the absence of such certification, the verification may be carried out through an interview with the candidate, including via online methods.

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.
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

The recognition of credits earned in previous university studies is determined, upon the student's request, by the Degree Programme Board.

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.

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

The recognition of credits earned in previous university studies is determined, upon the student's request, by the Degree Programme Board.

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.

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

Skills acquired outside the university may be recognized in the cases provided for by current regulations.
The recognition request will be evaluated by the Degree Programme Board, taking into account the guidelines provided by the Academic Bodies and the maximum number of credits allowable under the program's teaching regulations.
Recognition may be granted if the activity is consistent with the specific educational objectives of the study program and the recognized learning activities, considering both the content and the duration in hours of the activity undertaken.

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 FINAL EXAMINATION

- **Characteristics of the final examination**

The final examination for the Master's degree consists of the preparation and public defense, in English, of a thesis written and developed independently by the student, based on a research project conducted during the previous semester at an academic research laboratory or an industrial research laboratory under the supervision of an academic tutor. The research topic must align with the objectives of the study program and be carried out under the guidance of a supervisor.
The dissertation must demonstrate a thorough understanding of the subject matter, critical thinking skills, the ability to work independently, and a high level of communication proficiency.

- **Final examination criteria**

The thesis preparation activity consists of original experimental, theoretical, or field research on topics aligned with the educational objectives of the study program.
The activity may be partially carried out at one of the project's associated partners.
A faculty member from one of the partner universities acts as supervisor.
The supervisor and the research topic must be pre-approved by the Degree Programme Board and the Joint Project Coordination Committee.
The thesis must be an original written work in English, prepared by the student and approved by the supervisor.
The examination committee includes faculty members from the University of Bologna and at least one faculty member from one of the partner universities.
The final grade is determined by an average of the coursework completed mainly in the first year, the research and thesis preparation conducted in the second year, and the thesis defense.

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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 **2025/2026**
Scuola **Scienze**
Classe **LM-54 R-SCIENZE CHIMICHE**
Corso **6754-CHEMICAL INNOVATION AND REGULATION**

Primo Anno di Corso

Gruppo: Group of choice 01 - Design

TAF: B Ambito: 2090 - Organico-biotecnologico

Cfu min: 6 Cfu max: 6
Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 94259 - 0 - ALTERNATIVE PHARMACEUTICAL PRODUCTS DESIGN	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico B

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"

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"

6754 000 000 94258 - 0 - APPLIED NEW PRODUCTS	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico B

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 siutable formulations of chemicals for specific applications; 3. apply new products and formulations to food industry.

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

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 siutable formulations of chemicals for specific applications; 3. apply new products and formulations to food industry.

6754 000 000 94257 - 0 - INNOVATIVE PRODUCTS DESIGN	CON	CHIM/06	6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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: 2090 - Organico-biotecnologico

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 72838 - 0 - INDUSTRIAL INNOVATION	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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 achieves to the problems of chemical industry. A spectial 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 achieves to the problems of chemical industry. A spectial attention will be devoted to the emerging field of Nanotechnology, also in the light of regulatory constraints.

6754 000 000 94266 - 0 - NANOTECH INDUSTRY	CON	CHIM/06	6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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 obtainment fo 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 obtainment fo nanomaterial; 2. find innovative application to nanosized materials and find correct applications of nanomaterials for specific problems

6754 000 000 94265 - 0 - SUSTAINABLE PHARMA INDUSTRY	CON	CHIM/06	6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico B

Obiettivi: At the end of the course the student will be aware of the concenrs for thescientific, 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 contest 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 indistries; take care of the issues related to industrial forgery

Obiettivi inglese: At the end of the course the student will be aware of the concenrs for thescientific, 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 contest 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 indistries; take care of the issues related to industrial forgery

Gruppo: Group of choice 03 - Management

TAF: C Ambito: 2019 - 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.
6754 000 000 94264 - 0 - BUSINESS AND ENTERPRISE	CON	SECS-P/06		6	36/0/0/0	No	Voto

Ambito: 2019 - 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.

6754 000 000 94268 - 0 - BUSINESS AND MARKETING	CON	SECS-P/06	6	36/0/0/0	No	Voto

Ambito: 2019 - Attività formative affini o integrative C

Obiettivi: At the end of the course the student will be aware of the economic and management issus undelaying 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, tha students will be able: 1. to address and understand market researches; 2. to perform and understand a quality assessment according to the morst 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 issus undelaying 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, tha students will be able: 1. to address and understand market researches; 2. to perform and understand a quality assessment according to the morst important international standards; 3. performing business plan activities.

6754 000 000 94267 - 0 - QUALITY AND INNOVATION	CON	SECS-P/06	6	36/0/0/0	No	Voto

Ambito: 2019 - 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 booster innovation process. At the end of the course, tha students will be able to address and understand market researches. The student is expected to be able: 1. perform and understand a quality assessment according to the morst important international standards; 2. contribute to design, perform and exploit a market research; 3. fulfill the requrements 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 booster innovation process. At the end of the course, tha students will be able to address and understand market researches. The student is expected to be able: 1. perform and understand a quality assessment according to the morst important international standards; 2. contribute to design, perform and exploit a market research; 3. fulfill the requrements of quality standards and foster the application of quality in laboratory and industry

Gruppo: Group of choice 04 - Chemical Sustainability

TAF: B Ambito: 2090 - Organico-biotecnologico

Cfu min: 6 Cfu max: 6
Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 94269 - 0 - CHEMICAL SUSTAINABILITY	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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.

6754 000 000 94270 - 0 - CHEMISTRY FROM NATURE	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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;

6754 000 000 46072 - 0 - GREEN CHEMISTRY	CON	CHIM/06		6	36/0/0/0	No	Voto

Ambito: 2090 - Organico-biotecnologico 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 enzimes and microorganisms in place of chemicla reagents and catalysts; 3. assess the greeness 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 enzimes and microorganisms in place of chemicla reagents and catalysts; 3. assess the greeness of the proposed processes.

Gruppo: Group of choice 05 - Circular Economy

TAF: B Ambito: 2072 - Chimico-industriale

Cfu min: 6 Cfu max: 6
Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 94273 - 0 - Circular Economy	CON	CHIM/04		6	36/0/0/0	No	Voto

Ambito: 2072 - Chimico-industriale B

Obiettivi: At the end of the course the student will be aware that Circular economy is one of the key stratesies 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 albe: 1. to propose solutions that foster the circular economy in the chemical and related sectors exploitind recycling and reuse as the main tools; 2. to assess the criticity of supply of certain raw materials and to propose alternatives and/or best practices for their use; 3. to exploit the instuments 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 stratesies 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 albe: 1. to propose solutions that foster the circular economy in the chemical and related sectors exploitind recycling and reuse as the main tools; 2. to assess the criticity of supply of certain raw materials and to propose alternatives and/or best practices for their use; 3. to exploit the instuments of LCA for the assessment of improvements achievable through the implementation of circular economy.

6754 000 000 94274 - 0 - RAW MATERIALS	CON	CHIM/04		6	36/0/0/0	No	Voto

Ambito: 2072 - Chimico-industriale B

Obiettivi: At the end of the course the student will be aware of the criticiy of feedstock supply of some raw materials, bot organic or inorganic. The student will know how to design new products and processes for the improvment 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 studente is expected to be able to: 1. contributr to design products and processes that are intrinsecally 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 instuments of LCA for the assessment of improvements achievable.

Obiettivi inglese: At the end of the course the student will be aware of the criticiy of feedstock supply of some raw materials, bot organic or inorganic. The student will know how to design new products and processes for the improvment 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 studente is expected to be able to: 1. contributr to design products and processes that are intrinsecally 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 instuments of LCA for the assessment of improvements achievable.

6754 000 000 64842 - 0 - WASTE MANAGEMENT	CON	CHIM/04		6	36/0/0/0	No	Voto

Ambito: 2072 - Chimico-industriale B

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 tratment of waste waters in the perspective of thier reuse; 3. assess the respect by the processes implemented of 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 tratment of waste waters in the perspective of thier reuse; 3. assess the respect by the processes implemented of of waste materials regulations

Gruppo: Group of choice 06 - Toxicology

TAF: B Ambito: 2064 - Biochimico

Cfu min: 6 Cfu max: 6
Note:

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

6754 000 000 94276 - 0 - HUMAN TOXICOLOGY	CON	BIO/10	6	36/0/0/0	No	Voto

Ambito: 2064 - Biochimico 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 excrection 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 excrection of chemicals in the human body.

6754 000 000 97497 - 0 - TOXICOLOGICAL ASSESSMENT	CON	BIO/10	6	36/0/0/0	No	Voto

Ambito: 2064 - Biochimico 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 wiil 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 wiil 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.

6754 000 000 94275 - 0 - TOXICOLOGICAL PERSPECTIVE	CON	BIO/10	6	36/0/0/0	No	Voto

Ambito: 2064 - Biochimico 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 toxicologial 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 toxicologial 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: 2168 - Analitico, ambientale e dei beni

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 72842 - 0 - ENVIRONMENTAL ASSESSMENT	CON	CHIM/12		6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali 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 procecces and velocity of transformation that pollutants undego in the enviroment and forcast 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 procecces and velocity of transformation that pollutants undego in the enviroment and forcast their fate and impact.

6754 000 000 94277 - 0 - ENVIRONMENTAL SUSTAINABILITY	CON	CHIM/12	6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali 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.

6754 000 000 94278 - 0 - GLOBAL CONCERNS	CON	CHIM/12	6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali 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 menking and the environment. He/she will be aware of the international agreements for protaction 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 compartimentation 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 menking and the environment. He/she will be aware of the international agreements for protaction 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 compartimentation of pollutants.

Gruppo: Group of choice 08 - Assessment

TAF: B Ambito: 2168 - Analitico, ambientale e dei beni

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 94280 - 0 - DATA MANAGEMENT	CON	CHIM/01		6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali B

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 in findi out correlation and trends; 2. identify the best experimental framework for an efficient data collection; 3. mamage 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 in findi out correlation and trends; 2. identify the best experimental framework for an efficient data collection; 3. mamage large dataset.

6754 000 000 94279 - 0 - GENERAL ASSESSMENT	CON	CHIM/01	6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali B

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 iuncertainty of analytical data. The student will be able to; 1. assess the uncertainty of analytical data exploiting statistical methods; 2. manage experrimental complexity; 3. design the most correct choice of parameters and contition 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 iuncertainty of analytical data. The student will be able to; 1. assess the uncertainty of analytical data exploiting statistical methods; 2. manage experrimental complexity; 3. design the most correct choice of parameters and contition to perform efficiently the experimental workload.

6754 000 000 94281 - 0 - LABORATORY ASSESSMENT	CON	CHIM/01	6	36/0/0/0	No	Voto

Ambito: 2168 - Analitico, ambientale e dei beni culturali 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: 2094 - Inorganico-chimico fisico

Cfu min: 6 Cfu max: 6

Note:

Attività formativa	TIP	SSD	TAF	CFU	ORE F/E/L/N	FREQ.	VER.
6754 000 000 94284 - 0 - CHEMICAL PLANTS SAFETY	CON	CHIM/02		6	36/0/0/0	No	Voto

Ambito: 2094 - Inorganico-chimico fisico B

Obiettivi: At the end of the course the student will be aware of the peculiar risk of chemical plans 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 expecte to be able to: 1. assess the hazard deriving for chemical reactions; 2. implement the procedures for design and maintainance of safety in industrial chemical processe; 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 plans 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 expecte to be able to: 1. assess the hazard deriving for chemical reactions; 2. implement the procedures for design and maintainance of safety in industrial chemical processe; 3. manage the risk deriving from industrial chemical plants.

6754 000 000 94283 - 0 - CHEMICAL SAFETY	CON	CHIM/02	6	36/0/0/0	No	Voto

Ambito: 2094 - Inorganico-chimico fisico 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.

6754 000 000 97498 - 0 - RISK AND SAFETY	CON	CHIM/02	6	36/0/0/0	No	Voto

Ambito: 2094 - Inorganico-chimico fisico 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 fo 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 fo an efficient management of the chemical risk.

Gruppo: Group of choice 10 - Regulation

TAF: C Ambito: 2019 - 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.
6754 000 000 94285 - 0 - CHEMICAL REGULATION	CON	IUS/10		6	36/0/0/0	No	Voto

Ambito: 2019 - Attività formative affini o integrative C

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 peciluar regulations like biocides and pesticides. The student will be able to: 1. manage the issues of REACH registration and compliance; 2. compare the requrements 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 peciluar regulations like biocides and pesticides. The student will be able to: 1. manage the issues of REACH registration and compliance; 2. compare the requrements and constraints of REACH and other international regulations; 3. comply with the regulation of biocides and pesticides.

6754 000 000 94286 - 0 - FOOD AND DRUGS REGULATIONS	CON	IUS/10		6	36/0/0/0	No	Voto

Ambito: 2019 - Attività formative affini o integrative C

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 peciluar regulations like foods and pharmaceutial 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 peciluar regulations like foods and pharmaceutial 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

6754 000 000 97496 - 0 - REGULATION AND NANOTECH	CON	IUS/10		6	36/0/0/0	No	Voto

Ambito: 2019 - Attività formative affini o integrative C

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 criticity of regulations related to nanomaterials and nanotechnology that represent a rapidly growing innovation topic. Applicationof nanothechnology 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 expecte do be able to: 1. comply with REACH regulation and with CLP labelling; 2. manage issues relate 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 criticity of regulations related to nanomaterials and nanotechnology that represent a rapidly growing innovation topic. Applicationof nanothechnology 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 expecte do be able to: 1. comply with REACH regulation and with CLP labelling; 2. manage issues relate 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: 1007 - Ulteriori conoscenze linguistiche

Cfu min: 6 Cfu max: 6
Note:

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

6754 000 000 94288 - 0 - COMMUNICATION ATTITUDE 6 32/0/16/0 No Voto

Ambito: 1007 - Ulteriori conoscenze linguistiche F

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.

6754 000 000 94291 - 0 - INNOVATION ATTITUDE 6 32/0/16/0 No Voto

Ambito: 1007 - Ulteriori conoscenze linguistiche F

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.

6754 000 000 94289 - 0 - IT SKILLS 6 32/0/16/0 No Voto

Ambito: 1007 - Ulteriori conoscenze linguistiche F

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.

6754 000 000 94290 - 0 - RESEARCH ATTITUDE 6 32/0/16/0 No Voto

Ambito: 1007 - Ulteriori conoscenze linguistiche F

Obiettivi: At the end of the activity, in order to improve his/her skills as researcher, the student will gain basci 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 well be aware of the structure and features of research projects and in retrival of scientific information.

Obiettivi inglese: At the end of the activity, in order to improve his/her skills as researcher, the student will gain basci 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 well be aware of the structure and features of research projects and in retrival 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
Il Dipartimento 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.

6754 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.
6754 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.

6754 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.