



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



Proposta dell'offerta formativa del dottorato di ricerca in
“Ingegneria dei Prodotti e dei Processi Industriali”

Denominazione dell'insegnamento	Numero di ore totali sull'intero ciclo	Distribuzione durante il ciclo di dottorato (anni in cui l'insegnamento è attivo)	Descrizione del corso	Docente
<i>Preparazione di progetti di ricerca</i>	6/1CFU	Attivo sui 3 anni/suggerito al primo anno	The aim of this course is to explore the key elements in a research proposal and solve common planning and writing challenges. You will learn how to structure, define, and present your research idea in writing. You will develop your own research objectives and sub-questions and outline the context of the study. You will also learn how to manage a project.	da assegnare ad esterno GIUGNO 2025
<i>Risk Analysis of Chemical Processes</i>	25/4CFU	Attivo sui 3 anni/suggerito al primo anno	The course aims to introduce the basic notions of Risks Analysis in Chemical processes also providing the tools for conducting a complete risk assessment of industrial chemical processes. Topics covered include the fundamentals of combustion safety including explosions, fires and toxic dispersion, the notion of accidental scenario, the models for quantifying losses and dispersions, risk maps. Examples and case histories will be discussed and projects for the risk assessment of case study will be assigned.	Docenti DICMaPI LUGLIO 2025
<i>Open Science and research data management</i>	10/2CFU	Attivo sui 3 anni/suggerito al primo anno	The course aims to introduce to scholarly communication and to the principles of Open Science (Open Access to Publications, Open Data, Open Licenses) and Research Data Management. At the end of the course students will have a better understanding of the available research e-infrastructures, tools, and services for Open Access Publication, Research Data Management and FAIR Data. Students will also learn the importance of open science in research, especially to improve science reproducibility and increase research integrity. Finally, they will have the chance to practice on common tools for Research Data Management, like DMPOnline and Zenodo.	da assegnare ad esterno SETTEMBRE 2025



D I
C
M a
P I

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



<i>Sicurezza in laboratorio e i DPI</i>	12/2CFU	Attivo sui 3 anni/suggerito al primo anno	The course aims to provide PhD students with the knowledge and updates needed to work in a research laboratory preserving the state of safety. The course will guarantee a safe access to the research laboratories and make the students aware of the hazards related to specific environments, activities and procedures.	Docenti DICMaPI Cadenza bimestrale
<i>Trasferimento tecnologico ed imprenditorialità accademica</i>	9/1.5CFU	Attivo sui 3 anni/suggerito al primo anno	The process of technology transfer (TT) from the University to the business world deals with intellectual property protection, patent writing and management, consultancy activities for companies outside the University, and new entrepreneurial initiatives in the form of spin-offs. The course will give basic knowledge regarding: - the generation of companies based on technologies and skills developed within the University; - the management of interactions with the University technological know-how through Start-Ups and Spin-Offs; - the protection and enhancement of intellectual property through patents; - the collaboration between University and private companies.	Italo Mastrolia Direzione Affari legali di FORMEZPA OTTOBRE/NOVEMBRE 2025
<i>Green Manufacturing and Sustainability</i>	12/2CFU	Attivo sui 3 anni/suggerito al primo anno	Sustainability aims to conserve energy and natural resources, and to ensure that they have minimal impact on the environment and society. It targets at fulfilling the needs of the present without compromising the ability of future generations to meet their own needs. This course provides an overview of the Sustainability in Manufacturing Systems; various methodologies and its application to improving the eco-efficiency are focused. An additional objective is providing insights on Sustainable aspects management methodologies such as Lean manufacturing, Green Supply Chain, and Process Integration. Simulation of the systems is also discussed to make the students learn to cater the modern tools in virtual environment.	Antonello Astarita DICMaPI SETTEMBRE 2025
<i>Bridging state-of-the-art polymers to new developments: addressing current societal needs</i>	12/2CFU	Attivo sui 3 anni/suggerito al primo anno	The primary goal of this course is to educate engineers and chemists on the advances in polymer research that have occurred over the past decade, and to provide a future perspective. It will cover the fundamentals of polymers, including their chemistry, properties, and general applications, with a particular focus on bio-based and biodegradable polymers, as well as	Sabyasachi Gaan MAGGIO/GIUGNO 2025



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



			recyclable thermosets. The use of these polymers in the development of fiber-reinforced composites will also be discussed. Different approaches of fabrication, processing, and surface functionalization involving the use of polymers will be presented. Strategies for enhancing the fire safety of these polymers and composites will be highlighted, together with the principles of flame retardancy and flame retardant mechanisms, including the test methods commonly used in the laboratory for their analysis. Recycling and other end-of-life treatments of such polymers will be outlined in this course, also mentioning the limitations and challenges of the actual reprocessing technologies. Future trends in polymer manufacturing, including reactive extrusion, functionalization, innovative applications, and the integration of nanotechnology and functional additives, will be summarized.	
La conoscenza e l'uso in ambito scientifico di una lingua straniera	24/4CFU	Attivo sui 3 anni/suggerito al primo anno	Corso di inglese scientifico avanzato. Per i dottorati stranieri è previsto analogamente un corso di lingua italiana. Advanced Scientific English Course. Similarly, an Italian language course is planned for foreign candidates.	GIUGNO 2025
Utilizzo di strumenti informatici		Attivo sui 3 anni/suggerito al primo anno	The course aims at providing and enhancing the competences in the use of widespread software for scientific writing, data management, calculus, and communication.	OTTOBRE 2025
Materiali innovativi: approcci progettuali per lo sviluppo e la realizzazione di componenti strutturali	24/4CFU	Attivo sui 3 anni/suggerito al primo anno	This course provides a comprehensive and practical overview of the design, manufacturing, verification and validation approaches of composite/innovative/hybrid material structures, analysing material properties, manufacturing techniques and advanced design criteria typically employed in industrial manufacturing and applied research.	Fulvio Romano, CIRA MAGGIO 2025
Materials at elevated temperatures, creep modeling and simulation	8/1.5CFU	Attivo sui 3 anni/suggerito al primo anno	The Course aims to provide the latest theoretical and numerical tools to address the issue of viscous flow (CREEP) for high-temperature applications. In this context, design methodologies require knowledge of specific modeling techniques and advanced computational methods to describe/predict the behavior of materials at elevated temperatures.	Luca Esposito, Matteo Bruno SETTEMBRE- DICEMBRE 2025



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



Statistical Methods for Data Analysis	18/3CFU	Attivo sui 3 anni/suggerito al primo anno	The course aims to supply some basic and advanced knowledge regarding mathematical modelling of industrial processes, applied statistics, and parameter estimation, and to provide competences for the implementation of the relative techniques by means of computational tools.	Massimiliano Villone DICMaPI DICEMBRE 2025
How to boost your PhD (soft skills)	18/3CFU	Attivo sui 3 anni/suggerito al secondo anno	Nowadays, the scientific researcher profession requires a plurality of skills, on which we rarely stop to think about. Which ones are they? Above all, how to acquire them to turbo boost your PhD? The course is focused on this aspect of the scientific carriers. In particular, the topics covered include: i) Soft skills: a good training action will widen the spectrum of these skills as well as technical ones. ii) Scientific communication: what are the channels of communication and how to treat them properly will be focused within the course. iii) Digital Reputation: tips to analyse and control your digital presence will be given. iv) Outreach: which are the conditions that make the outreach event effective will be treated.	Antigone Marino GENNAIO/FEBBRAIO 2026
Flow chemistry	12/2CFU	Attivo sui 3 anni/suggerito al secondo anno	An introduction to the concept of flow chemistry will be provided, to help the researcher choosing the best options to conduct experiments in flow, in the case of fine chemicals production. Miniaturized systems as microreactors and millireactors will be shown in deep details, focusing the attention on their potentialities to solve technological problems often found when facing with either highly exothermic or endothermic reactions. The state-of-the-art of the modern applications of flow chemistry to chemical processes will be introduced, focusing the attention on photochemistry, partial oxidation, hydrogenation reactions. The students will get the elements to scale-up an operation to a continuous process.	Vincenzo Russo Scienze Chimiche MARZO 2026
Molecular engineering of proteins and metalloproteins	16/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims to provide practical skills in the computational design of proteins and metalloproteins. In particular, through analysis and discussion of selected examples from the literature, the student will learn the most up-to-date techniques of computational protein and metalloprotein design. By reproducing current literature cases, the student will understand the main concepts that drive protein folding and, consequently, the resolution of the	Marco Chino Scienze Chimiche APRILE/LUGLIO 2026



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



			inverse protein folding problem. The student will develop the following skills and knowledge: (a) understand and analyze protein structures in terms of their designability; (b) master one or more computational procedure in protein design (c) propose and discuss innovative projects for the analysis and design of tailored proteins and metalloproteins.	
<i>La spettroscopia infrarossa e Raman nella caratterizzazione molecolare dei materiali</i>	20/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course is intended to provide the general principles of the infrared spectroscopy in the mid and near infrared range, and the general principles of Raman spectroscopy. Theoretical and practical aspects will be addressed, with four case studies and a laboratory lesson.	Pellegrino Musto CNR MAGGIO 2026
<i>Food chemistry</i>	16/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course is intended to provide awareness of issues related to safety and preservation of food with respect to both natural transformations and manufacturing processes. Elements of nutritional relevance, raising increasing interest are also presented to make the attendants able to pursue further investigation and continuous updating	Alessandra Napolitano Scienze Chimiche LUGLIO/SETTEMBRE 2026
<i>Metodologie e Pratiche per la Redazione di Articoli Scientifici</i>	12/2CFU	Attivo sui 3 anni/suggerito al secondo anno	Il corso si propone di combinare una parte teorica con esercitazioni pratiche, e ha come obiettivo finale l'impostazione di un articolo scientifico (di conferenza o in rivista internazionale) da parte di ciascun partecipante, basato sulla propria proposta di ricerca.	Silvestro Vespoli. Liberatina Santillo LUGLIO/SETTEMBRE 2026
<i>Fondamenti di spettroscopia EPR e scattering di luce/neutroni per lo studio di nanomateriali</i>	16/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course activities are aimed at providing the fundamentals of the spectroscopic techniques of resonance and scattering (light and neutrons) applied to the study of materials, with particular emphasis on experimental and applicative aspects. The course will highlight the potential of the Electronic Paramagnetic Resonance (EPR) spectroscopy and of the light (LS) and neutrons (NS) scattering for obtaining information on the structure, dynamics and reactivity of materials for various technological applications, from industrial formulations to nanomedicine, from catalysis to energy	Giuseppe Vitiello DICMaPI MARZO 2026



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



<i>La metodologia Sol-Gel nella sintesi di materiali ibridi e nanocompositi</i>	18/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims at providing general knowledge of the structure and the synthesis techniques of hybrid and nanocomposite materials. In particular, the fundamental aspects of the sol-gel methodology for the development of functional hybrid materials will be addressed (e.g., the most commonly used precursors).	Antonio Aronne DICMaPI SETTEMBRE/OTTOBRE 2026
<i>Analysis and modelling of the additive manufacturing</i>	12/2CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims at providing the principles of transport phenomena in additive manufacturing or 3D printing. The course presents the basics of additive manufacturing and includes discussions of the properties of industrially available machines. At the end of the course, the student will be able to: I) design Fused Deposition Modelling processes, II) realize Computer Assisted Designs (CAD) of 3D parts and III) manufacture small tools for prototyping lab-setups.	Daniele Tammaro DICMaPI MARZO 2026
<i>Engineering for Circular Economy</i>	18/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims to introduce the paradigm of the circular economy, as opposed to the linear economy, currently seen as the way to achieve the goal of sustainability through the mitigation of resource consumption and environmental impacts related to production, use and disposal of goods. The main eco-design guidelines, that are intended to guide the engineer to design less impacting and more sustainable products, will be illustrated.	Paolo Aprea DICMaPI MARZO 2026
<i>Progettazione di Biomateriali</i>	18/3CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims to give the student theoretical tools for the study of the engineering properties of biological tissues through multi-scale approaches, for the choice of the most suitable materials, geometries and treatments in the design of biomedical devices.	Da assegnare DICMaPI SETTEMBRE 2026
<i>Bio-inspired design of drug delivery system</i>	12/2CFU	Attivo sui 3 anni/suggerito al secondo anno	The course aims to provide PhD students with the knowledge and skills to design bioinspired biomaterials for drug delivery, focusing on the optimization of material properties, fabrication techniques, and their translation into industrial applications.	Paolo Trucillo LUGLIO/SETTEMBRE 2026
<i>Data Acquisition (DAQ) Systems for Chemical Laboratories</i>	16/2CFU	Attivo sui 3 anni/suggerito al secondo anno	An introduction to sensors and actuators will be provided, to help the researcher choosing the best options to collect experimental data, regulating process variables (e.g temperature, pressure, fluid-flows), allowing to work in safe conditions.	Vincenzo Russo NOVEMBRE/DICEMBRE 2026



DI
C
Ma
PI

Dipartimento
di Ingegneria Chimica,
dei Materiali e della
Produzione Industriale
Università degli Studi
di Napoli Federico II



			A state-of-the-art software will be introduced (LabVIEW) and adopted to realistic Data Acquisition (DAQ) systems. The students will get the elements to design hands-on devices for lab-scale purposes.	
<i>Mitigation of the Environmental Impact of Chemical Processes for Energy Production</i>	16/3CFU	Attivo sui 3 anni/suggerito al terzo anno	The course is proposed for PhD Students in chemistry-, chemical engineering- and environmental sciences-related fields. The main objective is to contribute to the development of a qualitative and quantitative awareness concerning the impact of chemical processes for energy production on climate changes, and its mitigation by use of renewables, capture of gaseous pollutants, efficient design of chemical reactors, with an eye on techno-economical aspects as well.	Fabio Montagnaro Scienze Chimiche APRILE 2027
<i>Engineering for Sustainability</i>	18/3CFU	Attivo sui 3 anni/suggerito al terzo anno	The course is structured for highly transversal purposes. The training is aimed at the skills required for the implementation of interventions and planning of activities within the limits and conditions imposed by the need to balance the quality requirements of the environment and resources with those involved in improving the general context of society in which life. The training proposal involves the expected effects of natural hazards and anthropogenic activities on the complex of environmental components and their mitigation needs, and is aimed at acquiring the engineering skills associated with the needs of formulation and assessment of the environmental sustainability of the interventions.	Andrea D'Anna DICMaPI SETTEMBRE 2027

DICMaPI - Piazzale V. Tecchio, 80 - 80125 Napoli ITALIA

Dipartimento di Ingegneria Chimica, dei Materiali e della Produzione Industriale: www.dicmapi.unina.it

Unità organizzativa responsabile del procedimento: Ufficio per la Didattica

Capo dell'Ufficio: f.to Paola Desidery