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4. Progetto formativo

Attività didattica programmata/prevista

Insegnamenti previsti (distinti da quelli impartiti in insegnamenti relativi ai corsi di studio di primo e secondo livello)

n.	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	Eventuale curriculum di riferimento	Per i dottorati nazionali: percorso formativo di elevata	Verifica finale	Note

						qualificazione		
1.	Nanomedicine development	40	primo anno secondo anno	Lingua: Inglese Questo corso è stato diviso in due sezioni Part 1: Nanomedicine overview (ore 0-10) Lezione 1: What is nanomedicine? Barriers to general Drug treatments. Lezione 2: Nanomedicine: Types of drugs and how this affects our selection of Nanomedicines, Different types of Nanoparticles (overview), Lezione 3: Characterization of Nanomedicines and how they influence activity: Size, shape, charge, morphology, hydrophobicity etc. Lezione 4: Targeting Nanomedicines: Passive, physical, and ligand mediated. Passing from in vitro to in vivo models to improve clinical trial success Lezione 5: In depth comparison of polymeric and lipidic nanomedicines and their recent uses in the literature Part 2: Literature research and critical reviewing Lezione 6: How to perform a literature search and how to extract the critical information out of an article. I presented an article to the class and demonstrated how a reviewer must look into the information and judge the acceptability of a submission Lezione 7-10: Critical reviews. Each student took turns choosing a recent Article from the literature and presenting it for the class. The entire class then analyzed and critiqued the article as if they were an anonymous reviewer.	HEALTH PRODUCTS		NO	
2.	Technical English I	20	primo anno	1. Introduction to Scientific English as ESP (English for Specific Purposes): This section provides an overview of the general features of Scientific English, including syntax, lexis, terminology, and morphological peculiarities tailored for specific purposes. 2. Scientific Discourse: This section explores the concept of genre within scientific discourse, focusing primarily on abstracts and research articles (RA). It defines genre, examines discourse communities involved, communicative purposes, and outlines methodological premises for the course. 3. Abstract as a Genre: Here, the abstract is examined as a genre, covering its generic properties such as definition, structure, style, and intended audience. It discusses typologies of abstracts, tense issues, active and passive voice usage, evaluative lexis, and practical suggestions for abstract writing. 4. Research Article (RA) as a Genre: This section delves into the research	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	

				article genre, including its properties, discourse community involvement, communicative purposes, structure, style, and intended audience. A focus is placed on RA introductions, utilizing the CARS (Create a Research Space) model, rhetorical moves, steps, linguistic tools, and the study of collocations and grammar in scientific discourse using software like AntConc 3.2.1w.				
3.	Technical English II	20	secondo anno	1. More on Research Articles: This section focuses on methodology, exploring linguistic tools such as the passive voice in the past and NP-stacking. It also covers linguistic tools in the macro-sections of Results, Discussion, and Conclusion, including rhetorical resources like hedging, authorial comment, definition, that-nominalizations, and stylistic remarks concerning the use of progressive forms, second person, and imperatives. 2. Research Presentations as a Genre: This section examines research presentations, defining their generic properties, discourse community involvement, communicative purpose, structure, style, and intended audience. It discusses organizational strategies for effective presentations, including preparation, visual supports, performance, and speaker-audience interaction. A real example of a research presentation (Dubois 1981) is provided for illustration.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
4.	How to write a winning grant- Guida alla stesura di una domanda di finanziamento di successo	35	primo anno secondo anno	Programma: Writing competitive grant proposals is nowadays a fundamental task for scientists. Funded research projects are crucial to ensure scientific excellence, professional growth, as well as meritocracy. This course is a comprehensive, hands-on, interactive overview of the fundamental concepts of grant writing. Lectures will cover the complete grant development process from researching funding sources to developing, submitting and reviewing grant proposals. The overall goal of this course is to enable each participant to develop a competitive application, step-by-step.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
5.	Communicate science - Come scrivere e comunicare la scienza	35	primo anno secondo anno	Programma: Diffondere la Scienza in modo chiaro ed efficace è uno dei requisiti fondamentali per la divulgazione del progresso scientifico. Questo corso di scrittura scientifica e comunicazione vuole fornire le nozioni chiave per condividere con successo i risultati della ricerca in vari contesti: dalle	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	

				pubblicazioni, alle conferenze, fino ai social media. Obiettivi formativi specifici Alla fine del corso, ogni studente dovrebbe: ° Saper distinguere le varie forme di comunicazione scientifica; ° Essere familiare con il processo di pubblicazione di un manoscritto; ° Conoscere le diverse forme di pubblicazione scientifica e le relative tecniche di scrittura; ° Saper scegliere le riviste più appropriate per pubblicare; ° Saper scrivere i propri risultati in un abstract e comunicarli in meetings e conferenze in forma di poster o comunicazione orale; ° Eseguire una revisione valida e costruttiva di un paper di ricerca; ° Comprendere come scrivere il proprio curriculum vitae in modo efficace; ° Conoscere le varie forme di comunicazione alla società; ° Saper eseguire ed utilizzare al meglio la comunicazione scientifica sui social media.				
6.	Statistical design of experiments - Corso di statistica applicata al disegno sperimentale per dottorandi	35	primo anno secondo anno	Programma: Principles of causation: causal inference, directed acyclic graphs, relation between variables (bias, confounding, effect modification). Principles of statistical inference. Sample size and power calculation.Practical exercise on calculating power and sample size for experimental study. Choice of adequate statistical test. Overview of epidemiological study designs: Basics of experimental studies. Theoretical exercise on types of experimental studies and types of clinical trials. Statistical analysis in experimental design:Basics of correlation - use and misuse. Regression - basic principles: Linear regression and multiple linear regression. Practical exercise in SPSS or STATA. Logistic regression - basic concepts: Single and multiple logistic regression. Logistic regression - variable selection and model building. Logistic regression - statistical adjustment - interaction and confounding. Regression - diagnostics. Analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), analysis of covariance (ANCOVA), and multivariate analysis of covariance (MANCOVA). Repeated measures analysis.Basic concepts of time-to-event data. Testing for equivalency of time distributions (comparing survival curves). Regression models for time-to-event data (Cox regression).	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	

7.	Etica delle professioni	10	primo anno secondo anno	Programma: Le parole difficili: etica Principi etici della sperimentazione animale in ambito biomedico Sposarsi nel metaverso e robot per curare la solitudine: come convivere con la realtà virtuale Lo sport, i farmaci e le sostanze dopanti: un problema di lealtà, rispetto e salute L'Europa e i (suoi?) valori	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
8.	PhD Day	24	primo anno secondo anno terzo anno	Evento annuale ricorrente nel quale i dottorandi espongono la loro attività di ricerca e la discutono con il collegio di dottorato tutor, cotutor e colleghi. La lingua ufficiale dell'evento è l'inglese e tale evento è accompagnato dalla pubblicazione sul sito web del corso di dottorato del libro degli abstract.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
9.	PhD Degree	6	primo anno secondo anno terzo anno	Evento annuale ricorrente in cui la tesi di dottorato viene esposta pubblicamente e discussa con una commissione composta anche a membri di istutuzioni universitarie estere. La lingua ufficiale dell'evento è l'inglese.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
10.	Metabolomic Approaches in Pharmaceutical Research	6	primo anno secondo anno	Metabolomics is an analytical profiling technique used to measure and compare large numbers of metabolites present in biological samples, collectively known as the metabolome. By integrating high-throughput analytical chemistry with multivariate data analysis, metabolomics provides insights into metabolic mechanisms. Recently introduced among the Omics disciplines, metabolomics analyzes low molecular weight compounds across various biological systems and research fields. Metabolomics analysis can be categorized into two approaches: targeted and untargeted metabolomics. In targeted metabolomics, the metabolites selected for quantification are known and defined by the biological problem at hand, potentially representing specific pathways or classes of molecules. Conversely, untargeted metabolomics aims to identify as many metabolites as possible, involving both quantification and identification of metabolites. This course will discuss and compare the differences between targeted and untargeted approaches to metabolomics. Additionally, it will emphasize the value of untargeted metabolomics and provide guidelines for conducting such studies. Finally, selected applications of untargeted metabolomics will be presented, along with a discussion on their potential in pharmaceutical research.	HEALTH PRODUCTS		SI	

11.	Brains4Brain: networking for innovation in brain therapies	8	primo anno secondo anno terzo anno	A training day will be focused on investigation on developing new and innovative therapeutic strategies to cross the Blood-Brain Barrier (BBB), a capillary system that shields and defends the Central Nervous System (CNS) from circulating neurotoxic compounds. The BBB has a crucial protective filtering function but, unfortunately, also prevents most candidate therapeutic drugs under development for CNS diseases from accessing the brain. Within the aims of Brains4Brain Foundation (B4B), the seminars will be dedicated to the mission of promoting an International Network of health professionals specializing in rare disorders, particularly in the field of rare neurological diseases. During the training day, sector experts will share the latest research and innovative technologies aimed at overcoming the challenges posed by the BBB, offering new hopes for effective treatments for rare neurological diseases. PhD students will have the opportunity to discuss and collaborate, thus fostering the creation of synergies and networks that could fortify their advanced formation and may help in accelerating the development of therapeutic solutions for young patients affected by these complex conditions.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
12.	European Technology Platform in Nanomedicine Academy	125	primo anno secondo anno terzo anno	ETPN ACADEMY is dedicated to share competences in field of nanomedicine. Within the project, which connect different PhD courses around Europe, there is a wide expertise in several sectors of nanotechnology. The main aim is to share the training and transform into a credited module. The module can be used for MC DN and other EU projects and EC requires to be ECTS credited. The credits 5 ECTS credits require 125 hours in total split between direct contact learning, self-directed learning, videos and assessment. Within the development of the project, learning outcomes (LO) and the assessments will be carried out to evaluate if the ALO are met.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	
13.	ANALISI DEI DATI ED APPLICAZIONI DI INTELLIGENZA ARTIFICIALE NELL'AMBITO DEL FARMACO E DEI PRODOTTI PER LA SALUTE	4	primo anno secondo anno terzo anno	Ciclo di seminari, della durata di 2 ore ciascuno, in cui esponenti dell'industria farmaceutica verranno a parlare dell'applicazione degli approcci AI nei diversi contesti e fasi legate allo sviluppo del farmaco.	HEALTH PRODUCTS HEALTH TECHNOLOGIES		SI	

Riepilogo automatico insegnamenti previsti nell'iter formativo

Totale ore medie annue: 122.67 *(valore ottenuto dalla somma del Numero di ore totali sull'intero ciclo di tutti gli insegnamenti* *diviso la durata del corso)*

Numero insegnamenti: 13

Di cui è prevista verifica finale: 12

Altre attività didattiche (seminari, attività di laboratorio e di ricerca, formazione interdisciplinare, multidisciplinare e transdisciplinare)

n.	Tipo di attività	Descrizione dell'attività (e delle modalità di accesso alle infrastrutture per i dottorati nazionali)	Eventuale curriculum di riferimento
1.	Seminari	Drug Development Seminars on Drug Development, where leading experts will cover cutting-edge topics from drug discovery to clinical trials, providing insights into innovative techniques and industry best practices.	HEALTH PRODUCTS
2.	Seminari	Animal model for human diseases Seminars on Animal Models for Human Diseases, exploring advanced methodologies and their applications in understanding and treating human conditions, led by renowned experts in biomedical research.	HEALTH PRODUCTS HEALTH TECHNOLOGIES
3.	Seminari	Preclinical testing platforms Seminars on Preclinical Testing Platforms, where top experts will discuss innovative models and technologies used to evaluate drug efficacy and safety before clinical trials, enhancing research and development	HEALTH PRODUCTS HEALTH TECHNOLOGIES
4.	Seminari	Drug Discovery, Pharmaceutical Chemistry and Analysis Seminar on Drug Design, featuring leading experts who will explore the latest strategies and technologies in designing effective and innovative drugs, from molecular modeling to pharmaceutical chemistry and analysis	HEALTH PRODUCTS
5.	Seminari	Innovative pharmaceutical technologies Seminars on Innovative Pharmaceutical Technologies, where industry leaders will discuss cutting-edge advancements transforming drug delivery, formulation, and manufacturing for better healthcare solutions.	HEALTH PRODUCTS
6.	Seminari	Robotic Surgery Seminars on Robotic Surgery, featuring top surgeons and researchers who will explore the latest advancements, techniques, and applications of robotics in minimally invasive surgical procedures	HEALTH TECHNOLOGIES
7.	Seminari	Artificial Intelligence in Health Technologies and Drug Development Seminars on Artificial Intelligence in Health Technologies and Drug Development, where experts will delve into AI's transformative impact on medical diagnostics, personalized treatments, and drug discovery.	HEALTH PRODUCTS HEALTH TECHNOLOGIES
8.	Seminari	Formazione complementare per dottorandi 1.1 - Da dove vengono i soldi per la ricerca? Opportunità e percorsi per la ricerca e l'innovazione nazionali e internazionali 2.1 - Dalle politiche ai bandi di finanziamento europei 2.2 - Il Ciclo del progetto, la struttura del piano delle azioni e dei costi, gli Attori 2.3 Comunicare la ricerca: da Galileo alla citizen science 2.4 Progettare la ricerca in Europa: Valorizzazione dei risultati 2.5 La negoziazione e la gestione nei progetti Europei - Parte 1 2.6 La negoziazione e la gestione nei progetti Europei - Parte 2 3.1 Please cite my paper. Potenziare l'impatto della ricerca e sopravvivere alla bibliometria 3.2 La valutazione della qualità della ricerca tra bibliometria e peer review 3.3 Open access vs paywalls. L'accesso (aperto) alla letteratura scientifica 4.1 I diritti di proprietà intellettuale. Metodi di Tutela; Brevetti; Come scrivere le rivendicazioni; Gestire e sfruttare la PI; Banche dati brevettuali 4.2 Esperienze di Open Innovation nell'Ecosistema emiliano-romagnolo 4.3 L'ecosistema dell'Innovazione in Emilia-Romagna	HEALTH PRODUCTS HEALTH TECHNOLOGIES
9.	Seminari	One Health drugs against parasitic vector borne diseases (VBPD) in Europe and beyond. (OneHealthdrugs) OneHealthdrugs (OHD) aims at coordinating the discovery of drugs halting human and animal vector	HEALTH PRODUCTS HEALTH TECHNOLOGIES

		borne parasitic disease (H&A VBD) keeping with the principles of optimal profile, low environmental impact for both human and veterinary medicine, increasing the drug quality and delivery technologies. The COST Action aims at the integration and generation of synergies among drug R&D experts from the chemical / biological / human / veterinary and earth science/ecotoxicologists within academies, SMEs, industries, governments. The platform encompasses pre-clinical drug discovery, animal studies, and drug delivery. Strategies such as bioinformatics, PROTAC and omics technologies other than nanotechnology will be enhanced. OneHealthdrugs impact in Europe and in disease-endemic countries and worldwide (49 countries associated). The Action will provide a compounds database and a white chart about the discovery of new drugs with optimal ecotox profile for H&A infections. Expected benefits include the transfer of academia-industry and Northern-Southern world knowledge. Conferences, training schools for advanced technologies, and short-term fellowships (STSMs) are granted for young researchers and innovators including PhD students. Therefore, the OHD COST Action represents the ideal collaborative environment for the PhD school in Health drug discovery and technologies to promote the OneHealth concept and transfer knowledge and technologies through the mentioned activities. (www.onehealthdrugs.com, linkedin: https://www.linkedin.com/groups/9557829/)	