

Sustainable Process Development Chemist

Sustainable Process Development Chemists work at the intersection of drug discovery and industrial-scale production. They ensure that pharmaceutical compounds can be manufactured in a safe, cost-effective, and environmentally responsible way, considering life cycle impact, regulatory frameworks, and supply chain factors already in the design phase.

<ESCO Mapping> - <link to ESCO (European Skills, Competences, Qualifications and Occupations)>

ID	NAME	Concept URI
62210d1e-d16e-4db1-b5cb-47b1cb1be65f	Chemical production engineer	ESCO URI

Context

EQF Levels

7/8

Departments

Production
R&D (Research and Development)

Profile Sectors

Typically requires a Master's degree or PhD in chemistry, process engineering, or pharmaceutical sciences, with several years of experience in pharmaceutical process development

Green Competences

Name	Type	Description	Level	ESCO
Green Chemistry	Knowledge	The process of creating chemical products that diminish or cancel the negative impact on the environment caused by the use of hazardous substances. It follows all the phases of chemical product generation from the design to the manufacturing and its disposal.	2	ESCO URI

Life cycle thinking	Knowledge	Understand environmental impacts across a product's life cycle to inform sustainable decisions in process design.	3	ESCO URI
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Digital Competences

Name	Type	Description	Level	ESCO
Cyber security	Knowledge	The methods and best practices that protect ICT systems, networks, computers, devices, services, processes and people against unauthorised access, modification and/or denial of service of assets.	2	ESCO URI
Data-driven process optimization	Skill	Leverage data analytics and AI to improve yield, reduce waste, and ensure reproducibility in drug production.	3	ESCO URI
Use of simulation software for chemical processes	Skill	Operate modelling tools to optimize reaction conditions, scalability, and resource efficiency	3	ESCO URI
Digital documentation and compliance systems	Knowledge	Work with digital quality management and regulatory documentation systems (e.g. GMP e-systems).	2	ESCO URI

SSbD (Safe and Sustainable by Design Chemicals)

Name	Type	Description	Level	ESCO
Sustainable manufacturing	Knowledge	The generation of manufactured products using efficient and sustainable production process that enhances the conservation of natural and energy resources while minimizing negative environmental impacts.	2	ESCO URI
Early-stage manufacturability assessment	Skill	Assess process feasibility during early R&D to ensure scale-up is safe, efficient, and compliant.	2	NA
Risk assessment of chemical processes	Skill	Identify and mitigate safety and environmental risks in early-stage development	2	ESCO URI

Transversal Competences

Name	Type	Description/Context	Level	ESCO
Communication, collaborating and creativity	Skill	Communicating, collaborating, liaising, and negotiating with other people, developing solutions to problems, creating plans or specifications for the design of objects and systems, composing text or music, performing to entertain an audience, and imparting knowledge to others.	2	ESCO URI
Regulatory awareness (e.g., EMA, REACH)	Knowledge	Understand and apply evolving pharmaceutical and environmental regulations in process development	3	ESCO URI
Problem-solving and decision-making	Skill	Tackle complex technical challenges using structured methodologies and critical thinking	3	ESCO URI
Communication across disciplines	Skill	Translate scientific insights for stakeholders in sustainability, quality, and manufacturing.	2	ESCO URI