Co-funded by the Erasmus+ Programme of the European Union	**BeWell – 3D modelling and Printing in health and care Matrix**		
EQF Level	**5**	**ESCO**	3D printing process (Knowledge)[1] 3D modelling (Knowledge)[2]
Aggregated Units of Learning Outcomes	**BeWell – NEOP 7**		**3D modelling and Printing in health and care**

Co-funded by the Erasmus+ Programme of the European Union	BeWell – NEOP Matrix	
Generic Title of the Training programme:	**NEOP 7 – 3D modelling and Printing in health and care**	

[1] **Description:** The process of reproducing 3D objects by using 3D printing technologies.

[2] **Description:** The process of developing a mathematical representation of any three-dimensional surface of an object via specialised software. The product is called a 3D model. It can be displayed as a two-dimensional image through a process called 3D rendering or used in a computer simulation of physical phenomena. The model can also be physically created using 3D printing devices.

<table>
<tr><td colspan="2">Description:</td><td colspan="3">This Training programme provides learners with foundational and practical knowledge of 3D printing in health and care. It covers the principles, technologies, and applications of additive manufacturing in medical settings, including CAD modelling, biomedical imaging, slicing techniques, and regulatory considerations. Learners will develop skills in designing, processing, and evaluating 3D-printed medical components to meet health and care industry standards.</td></tr>
<tr><td colspan="2">EQF Level:</td><td colspan="3">5</td></tr>
<tr><td colspan="5">Learning Outcomes</td></tr>
<tr><td rowspan="2">NEOP 7 – 3D modelling and Printing in health and care</td><td rowspan="2">Training Module # in MOOC</td><td colspan="3">Competence (Autonomy and responsibility)</td></tr>
<tr><td colspan="2">Knowledge</td><td>Skills</td></tr>
<tr><td rowspan="5">7.1 Applying 3D Printing Technologies in Health and Ccare</td><td rowspan="5">Module 1</td><td colspan="3">Is able to describe the principles, history, and key technologies of 3D printing and assess their relevance in health and care.</td></tr>
<tr><td rowspan="2">Knows the evolution and technological advancements in 3D printing.</td><td>Identifies key milestones in the development of 3D printing.</td></tr>
<tr><td>Explains the impact of additive manufacturing in medical applications.</td></tr>
<tr><td rowspan="2">Understands the primary applications of 3D printing in medicine, including anatomical modelling, surgical tools, and prosthetics.</td><td>Assesses the suitability of 3D printing for different medical applications.</td></tr>
<tr><td>Identifies challenges and opportunities in clinical adoption.</td></tr>
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7.2 Utilising Additive Manufacturing for Medical Innovations		Is able to analyse and compare key additive manufacturing techniques for biomedical applications.	
		Knows the working principles, material compatibility, and applications of additive manufacturing processes (e.g., Material Extrusion, Binder Jetting, Powder Bed Fusion, etc.).	Differentiates between additive manufacturing technologies based on their applications.
			Evaluates the advantages and limitations of each method in medical settings.
		Understands process parameters and post-processing techniques required for high-quality biomedical prints.	Selects appropriate post-processing methods to enhance 3D-printed medical parts.
			Adjusts process variables to optimise print quality and functionality.
7.3 Designing Biomedical Models with CAD for 3D Printing		Is able to create and optimise CAD models for biomedical 3D printing applications.	
			Designs CAD models for anatomical structures and medical devices.

		Knows the principles and workflows of CAD modelling for 3D printing.	Modifies CAD designs to meet printing and post-processing requirements.
		Understands common challenges in biomedical CAD design.	Identifies and resolves issues related to geometry, mesh quality, and model integrity.
7.4 Implementing Slicing Techniques and G-code in Medical 3D Printing		Is able to configure slicing software and adjust G-code to optimise 3D printing processes in health and care.	
		Knows the role of slicing in 3D printing and key parameters affecting print quality (e.g., layer height, infill density, support structures).	Adjusts slicing parameters to enhance print resolution and durability.
			Troubleshoots slicing-related print defects.
		Understands G-code modifications for printer control and performance.	Interprets and customises G-code for optimised medical 3D printing.
			Implements G-code commands to improve precision and efficiency.

7.5 Processing Biomedical Images for 3D Printing Applications		Is able to process biomedical imaging data to create accurate 3D models for patient-specific applications.	
		Knows the role of biomedical imaging (CT, MRI) in 3D model generation.	Processes imaging data for segmentation and anatomical reconstruction.
			Identifies key tools and workflows for generating patient-specific 3D models.
		Understands challenges and advancements in imaging-based 3D printing.	Evaluates segmentation techniques for accuracy and usability.
			Selects appropriate software tools for imaging-to-print workflows.
7.6 Ensuring Quality and Compliance in Medical 3D Printing		Is able to apply post-processing techniques and assess regulatory standards for 3D-printed medical devices.	
		Knows common post-processing techniques (e.g., sterilisation, surface finishing) for biomedical 3D printing.	Selects and applies post-processing methods suitable for medical-grade prints.
			Ensures print quality meets functional and biocompatibility standards.

		Understands the regulatory landscape for 3D-printed medical devices	Identifies relevant medical device classifications and compliance requirements.
			Assesses regulatory challenges and solutions for patient-contact and implantable devices.
7.7 Innovating with 3D Printing for Future Health and Care Solutions		Is able to evaluate current and emerging applications of 3D printing in health and care and related industries.	
		Knows the diverse applications of 3D printing across health and care, construction, and education.	Compares industry-specific advancements in additive manufacturing.
			Identifies interdisciplinary opportunities for 3D printing applications.
		Understands future trends, including bioprinting, AI-driven design, and sustainable manufacturing.	Evaluates the potential of bioprinting for regenerative medicine and drug testing.
			Assesses the impact of AI and novel materials on the evolution of 3D printing.