

Syllabus

1. Information about the **Module 4**

1.1 University	NOVA University of Lisbon
1.2 Team	UNL team
1.3 Trainer_Name	MsC Filipe Silvestre
1.3 Degree level	Masters

2. Information about the course

Module title	Design and Materials used for Personal 3D Printers
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3. Time budget

3.1 Number of hours	15	divided in:	Lecture	180 mins	Laboratory/Project	720 mins.
3.2 Time budget distribution (hours) for individual activity:						
(a) Individual study (course, obligatory bibliography, etc.)						2
(b) Additional documentation (recommended bibliography, etc.)						1
(c) Preparation for seminary/laboratory/project activities						1
(d) Peer learning						0
(e) Exam preparation						0
(f) Other activities						0
3.3 Total individual study (sum (3.7(a)...3.7(f)))					4 h	
3.5 ECTS credits					0.6	

4. Preconditions

4.1 Curriculum	Librarian
4.2 Competences	Spatial awareness, technical skills, computer using knowledge

5. Course requirement

5.1. For lectures	Lecture room with video projector and laptop
5.2. For seminary/ laboratory/ project	Laboratory room with video projector, laptop, 3D printers

6. Gained competences

Professional competences	<ol style="list-style-type: none"> 1. Explaining concepts specific processes and solving engineering problems phased expert on mathematical algorithms and basic knowledge of mechanics 2. Develop technical project execution for partial assemblies basic 3. Competences in organizing new services in libraries 4. Competences in managing a Makerspaces in libraries
Transversal competence	<ol style="list-style-type: none"> 1. Familiarity with specific roles and teamwork activities and distributing tasks to subordinate levels 2. Familiarity with new business models in libraries

7. Course/module objectives

7.1 General objective	By the end of this module students should be able to: Identify CAD software as a tool for 3D printing design and differentiate the several types of materials used in personal 3D printers
7.2 Specific objectives	Learners should be able to: <ul style="list-style-type: none"> - Assess CAD software as a tool for designing in 3D printing - Produce one design project using CAD software - Compare the different types of materials used for Personal 3D Printers (FDM / SLA) - Distinguish between PLA, ABS, PET, NYLON, TPU and PC - Distinguish between Standard resins, clear resin, tough resin, heat resistant resin, rubber-like resin, ceramic filled resin

8. Contents

8.1 Lecture	Hours	Teaching methods	Observation
Design and Materials used for Personal 3D Printers			
1. Introduction to Design - Computer aided design (CAD)	1	Video projector expository method, white or chalk board, discussion	
<ul style="list-style-type: none"> • Understanding how Computer aided manufacturing – CAM, helps the process of 3D designing and printing 	30min		

2. Introduction to Materials for 3D printing	2	Video projector expository method, white or chalk board, discussion	
<ul style="list-style-type: none"> Filament Deposition Modelling – FDM Stereolithography (SLA) 			
2.1 Introduction to FDM	1		
<ul style="list-style-type: none"> PLA ABS PET NYLON TPU PC 			
2.2 Introduction to SLA	1		
<ul style="list-style-type: none"> Standard resin Clear resin Tough resin Heat resistant resin Rubber-like resin Ceramic filled resin (rigid) 			
8.2 Laboratory / Project	Hours	Teaching methods	Observation
Design and Materials used for Personal 3D Printers			Participants should have access to a computer/laptop
1.1 How to design	12 h	Practical work Development of a design project	
<ul style="list-style-type: none"> Know the UI 2D sketching <ul style="list-style-type: none"> Create Modify 3D modelling <ul style="list-style-type: none"> Create Modify Saving/Exporting 			

8.3 Bibliography

[1] Contributors to Wikimedia projects, "Computer-aided design," Wikipedia, May 24, 2021. https://en.wikipedia.org/wiki/Computer-aided_design (accessed Jul. 15, 2021)

[2] G. Ponce, "What Is CAD? – Simply Explained," All3DP, Sep. 16, 2020. <https://all3dp.com/2/what-is-cad-design-simply-explained/> (accessed Jul.15, 2021)

[3] "Best free CAD software to download in 2021: Our selection," Sculpteo. <https://www.sculpteo.com/en/3d-learning-hub/3d-printing-software/best-free-cad-software-selection/> (accessed Jul. 16, 2021).

[4] L. Carolo. "AutoCAD tutorial.6 easy steps for beginners", All3DP, May 16, 2021. <https://all3dp.com/2/autocad-tutorial-for-beginners/> (accessed Jul.15, 2021)

[5] 3d Matter. "FDM 3D printing materials compared," Hubs. A Protolabs Company, 2021 <https://www.hubs.com/knowledge-base/fdm-3d-printing-materials-compared/> (accessed Jul. 18, 2021).

[6] M. Latouche. "SLA 3D printing materials compared," Hubs. A Protolabs Company, 2021 <https://www.hubs.com/knowledge-base/sla-3d-printing-materials-compared/> (accessed Jul. 19, 2021).

9. Evaluation at the end of the course

Activity	10.1 Evaluation criteria		
10.4 Lecture		No evaluation	
10.5 Laboratory/ Project		Design and print a 3D part	