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GENERAL INFORMATION								
Course name AM5. Modelling and Simulation of Additive Manufacturing								
		Pr	ocesses		j			
Semest	ter	3	Charact	er	Compulsory	Type of module	Specialisati on	
ECTS	5			Modality	Face-to-face	<u></u>		
Higher Education Institution(s					Koszalin University of Technology			
Lecture	$\frac{-\alpha \alpha}{r(s)}$			(-)	Błażej Bałasz			
Lecture	(5)				Mirosław Wesołowski			
LEARNING AND TEACHING								
ESCO C	Dccur	pation(s	)	Mai	Manufacturing engineer			
					Calculation engineer			
ESCO Skill & Competences					Computational mechanics			
(*no ESCO)					Create a product's virtual model			
					Interpret technical requirements			
					Combine multiple fields of knowledge			
Learning outcomes					KU1, EA1, EA2, ED2, EP5			
(Please refer to Appendix 4 for the					, , , , , , , , , , , , , , , , , , , ,	, 21.0		
interpretation of the acronym)								
Teaching methods					tures.			
J					Flipped Classroom			
					Case Studies			
					Workshops			
Accessment methods					mination			
Assessment methods					hnical report			
Oral presentation & defence								
CONTENTS								
Previous requirements (if necessary)								
Content index								
1. Computer modelling (CAD):								
Creation of digital					3D models.			
	CAD tools used in			design.				
2. 5	2. Simulation of the printing			process:				
	•	Predicti	ng the beha		r of materials du	ring printing.		
2 5	<ul> <li>Identification of po</li> <li>Elemental analysis (EEA);</li> </ul>			tenti	tential problems.			
J. L	Strength analysis of 3D models							
	•	Evaluati	ion of mech	anic	al properties			
4. Flow simulation:								
Analysis of fluid and gas flow.								
	•	Optimis	ation of cod	oling	structures.			
5. T	Therm	o-mechai	nical simula	tion				
Analysis of temperature changes during printing.								
<ul> <li>Effect of temperature on material properties.</li> </ul>								
6. Microstructural simulation:								
Analysis of the microstructure of materials.								
Effect of the printing process on the microstructure.     Simulation of the machining process:								
/. Simulation of the machining process:								
Prediction of next-processing processor								
8 9	Stress	and strai	n prediction	n'	ocessing processe	-5.		
Stress and strain prediction.     Stress and strain models in AM processes.								
	<ul> <li>Stress simulation techniques in 3D printed materials.</li> </ul>							
9. A	9. AM process optimisation:							
	•	Optimis	ation algori	thms	5.			
	<ul> <li>Practical applications of optimisation.</li> </ul>							









10. Application of artificial intelligence in AM simulations:

- AI algorithms to support simulations.
- Examples of AI applications in AM.

## SUPPORTING BIBLIOGRAPHIC REFERENCES

Elsevier ScienceDirect Library

## SOFTWARE

Ansys, Simufact Additive, FLOW-3D, nTOP