GENERAL INFORMATION					
Subject name	AM2. Additive Manufacturing Technology from Polymers				
Semester	3	Character	Compulsory	Type of module	Specialisation
ECTS	5		Modality	Face-to-face	
Higher Education Institution(s)			Koszalin University of Technology		
Lecturer(s)			Tomasz Królikowski Mirosław Wesołowski		

LEARNING AND TEACHING	
ESCO Occupation(s)	Manufacturing engineer Calculation Engineer
ESCO Skill & Competences (*no ESCO)	Select material to process Produce sustainable products Create a product's virtual model 3D printing process Statistical process control
Learning outcomes (Please refer to Appendix 4 for the interpretation of the acronym)	KU1, EA2, EP3
Teaching methods	Lectures. Flipped Classroom Case Studies Simulation-Based Learning Workshops
Assessment methods	Examination Technical report Oral presentation & defence

CONTENTS

Previous requirements (if necessary)

Content index

1. Introduction to additively manufacturing from polymers:
   - History and development of the technology.
   - Overview of the main methods of 3D printing from polymers.
2. Polymer materials used in 3D printing:
   - Types of polymers and their properties.
   - Selection of materials for different applications.
3. Stereolithography (SLA):
   - Principle of operation.
   - Practical examples and applications.
4. Fused Deposition Modelling (FDM):
   - Mechanism of the process.
   - Parameter settings and their impact on print quality.
5. Selective Laser Sintering (SLS):
   - Operating principle.
   - Examples of applications and case studies.
6. Post-processing of polymer prints:
   - Finishing.
   - Support removal and surface finishing techniques.
7. Design for 3D printing from polymers:
   - DfAM principles for polymers.
   - Optimisation of geometries and structures.
8. Quality control in 3D printing from polymers:
   - Methods for evaluating print quality.
   - Non-destructive testing techniques.
9. Applications of 3D printing from polymers in various industries:
   - Medical, automotive, food industry.
   - Case studies from actual implementations.
10. Future and innovation in 3D printing from polymers:

- New materials and technologies.
- Anticipated developments and applications.

11. Introduction to composites in additive manufacturing:
    - Characteristics and types of composites.
    - Principles and applications of 3D printing of composites.
12. Composite materials used in 3D printing:
    - Reinforcing fibres (e.g. carbon, glass).
    - Polymer matrices and their properties.
13. Technologies for 3D printing of composites:
    - FDM methods with composites.
    - Other 3D printing technologies applied to composites.
14. Design for 3D printing of composites (DfAM):
    - Optimising designs for mechanical properties.
    - Use of internal structures and reinforcing layers.
15. Applications of 3D printed composites in various industries:
    - Aerospace, automotive, medical.

SUPPORTING BIBLIOGRAPHIC REFERENCES

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SOFTWARE

Ansys, nTop, Simufact Additive, NetFab