Call: HORIZON-WIDERA-2021-ACCESS-03/Twinning

Project SustDesignTex (GA No. 101079009), title: „Sustainable Industrial Design of Textile Structures for Composites" funded by the European Union

Deliverable Report

SUSTainable industrial DESIGN of TEXtile structures for composites (SustDesignTex)

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Deliverable Title	**D5.2: Educational course for MSc students**
Deliverable Lead:	*Lodz University of Technology*
Related Work Package:	*WP5: Design and realization of dedicated composite reinforcements taking into account the aspects of sustainable development.*
Author(s):	*Tsegaye Lemmi & Marcin Barburski*
Dissemination Level:	*Public*
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Abstract:	*This deliverable report summarizes the educational courses given for MSc. Students at Lodz University of Technology as part of SustDesignTex project realization. The courses were given by various experts from project partner institutions.*

Contents

1. Introduction

This deliverable presents a comprehensive overview of the educational courses delivered for MSc. Students of Fashion Design, Textile Engineering, and Materials Engineering departments at Lodz University of Technology during the realization of SustDesignTex project. As part of the broader initiative to enhance the quality and international relevance of postgraduate education, short-term educational courses were delivered by distinguished experts from SustDesignTex project partner institutions. The courses covered a range of topics in sustainable composite manufacturing for various applications and patenting system.

The courses were delivered by professors from project partner universities in the form of visiting professor in online and face-to-face mode.

2. Objectives

The main objective of this deliverable was to:

- provide MSc students with advanced knowledge from international experts.
- expose students to global academic and professional practices.
- encourage institutional collaboration between partner universities.
- enhance the academic portfolio of the host institution through guest-led modules.
- build a foundation for future joint teaching initiatives between project partner institutions.

3. Course selection and Development

The courses delivered were selected in collaboration with academic departments of Lodz University of Technology and international partners, SustDesignTex project goals, emerging academic trends in the area of the SustDesignTex project, and the expertise of the partner institutions. The courses were delivered in the way that ensured coherence with the Lodz Universities of Technology's curriculum, alignment with the academic level of MSc students, and objectives of SustDesignTex project.

4. Course details

The List of courses delivered are presented in the following table and averagely over 20 students were able to participate in each course.

Course title	Partner University	Lead Instructor	Dates	Mode of delivery
Composite Materials: Raw Materials, Properties, Manufacturing Processes, Design, Analysis and Applications	University of Zaragoza	David Ranz and Jesus Cuartero	09.10.2023 – 27.10.2023 Total of 30 hours	Online via MS. Teams
Bio-composite – concept possibilities and Challenges.	University of Boras	Mikael Skrifvars	13.05.2024 – 14.05.2024 Total of 10 hours	Face-to-Face
Circular Economy Strategies for Polymer Materials				
Practical skills in the field of international patent protection	ITA of RWTH Aachen University	Susanne Ruffert, Kristin Jirka, and Rebecca Emmerich	09.05.2024 Total of 3 hours	Hybrid

4.1 Composite Materials: Raw Materials, Properties, Manufacturing Processes, Design, Analysis and Applications

The course delivered by experts from University of Zaragoza was in the form of lectures and virtual laboratory exercises. The lectures included introductions about composite materials, raw materials used for composite manufacturing ranges of reinforcement and matrix types were presented, various composite manufacturing techniques and composite property analysis methods were also thoroughly presented during series of lecture sessions. During the virtual laboratory sessions, the experts have shown how to produce composite materials.

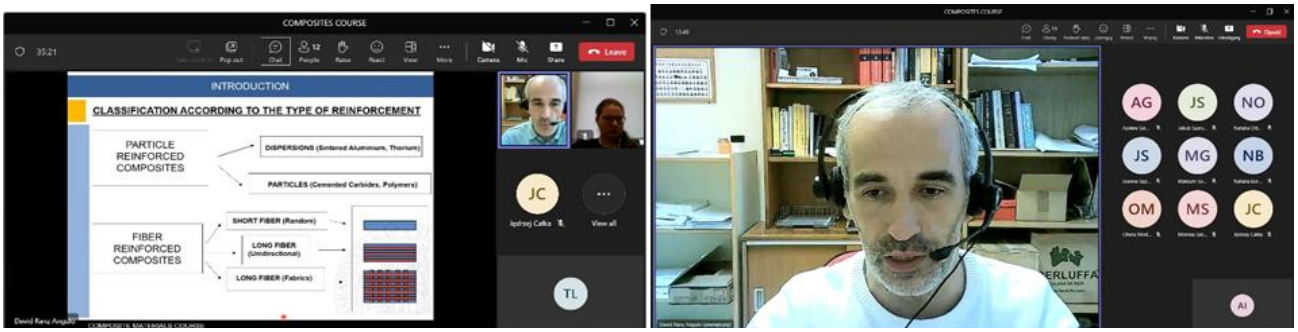

Figure 1. Pictures taken during the lecture delivered by UNIZAR expert.

4.2 Bio-composite – concept possibilities and Challenges, and Circular Economy Strategies for Polymer Materials

The course was delivered in the form of lecture by Professor Mikael Skrifvars from University of Boras during his visit to Lodz University of Technology. Professor Skrifvars has a shared with Lodz University of Technology students his deep understanding and experience in the areas of bio based composite materials and circular economy strategies and real-world challenges for polymer materials.

Figure 2. Picture taken during Prof. Mikael Skrifvars lecture at TUL.

4.3 Practical skills in the field of international patent protection

Experts from RWTH Aachen University were also delivered a lecture in hybrid form detailed about patent system including introduction to Intellectual Property Rights (IPR), how does protection work, how to obtain patent protection, requirements of patentability and many more related cases were delivered meticulously by the experts.

Figure 3. Pictures taken during the lecture course delivered by ITA experts.

5. Outcomes and impact

- The students gained practical and cutting-edge knowledge in specialized topics.
- Increased awareness of career-related issues such as IP protection.
- Students built international academic connections and engaged with diverse teaching styles.

6. Conclusion

The short-term hybrid courses delivered by SustDesignTex partner universities significantly enriched the academic offering for MSc students. The courses exposed students to international teaching methods, and demonstrated the effectiveness of cross-institutional hybrid education. This initiative is a strong foundation for further collaboration and integration of international teaching in postgraduate education.