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Erasmus+ Programme Key Action 2 Cooperation  
Partnerships for Higher Education (KA220-HED)  
Agreement number 2023-1-RO01-KA220-HED-000155412

European Network for Additive Manufacturing in Industrial Design for Ukrainian Context

## REPORT – Summer School

### SUMMER SCHOOL ON VIRTUAL E-LEARNING PLATFORM FOR ADDITIVE MANUFACTURING IN INDUSTRIAL DESIGN

hosted by National University of Science and Technology Politehnica Bucharest, Romania  
in cooperation with the AMAZE project consortium partners

Date: 8-17.07.2024, between 10.00-16.00, hall A4.2, Building Politehnica Bucharest  
Central Library, address Splaiul Independenței, nr. 313. Bucharest, 060042, Romania

The Summer School of the project - Agreement number 2023-1-RO01-KA220-HED-000155412, Acronym: AMAZE with the title “*European Network for Additive Manufacturing in Industrial Design for Ukrainian Context*”, Erasmus+ Programme Key Action 2 Cooperation Partnerships for Higher Education (KA220-HED), took place on 8.07.2024-17.07.2024, and were participated **students and staffs from project partners (PUT, YFCNU and Edibon International S.A. company)** and were invited professors and students from National University of Science and Technology Politehnica Bucharest. The event was hosted by **National University of Science and Technology Politehnica Bucharest, Romania.**





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The event was attended by representatives of the 4 partners: National University of Science and Technology Politehnica Bucharest - Romania, Poznań University of Technology (PUT) – Poland, Yuriy Fedkovych Chernivtsi National University – Ukraine and EDIBON International S.A. Madrid – Spain.

The participants at the Summer School, hosted by National University of Science and Technology Politehnica Bucharest, Romania, were from Poznań University of Technology (PUT) – Poland (5 students and 2 staffs), from Yuriy Fedkovych Chernivtsi National University (YFCNU)– Ukraine (5 students and 2 staffs) and from EDIBON International S.A. company (2 staffs from Romanian branch, and on-line MS Teams), and different professors and students from Politehnica Bucharest involved in the AMAZE project.



The Summer School on “*Virtual e-learning platform for additive manufacturing in industrial design*” started on 8.07.2024, at 10.00 o’clock, having the participants registration, the event opening with Mrs. Assoc.Prof.Dr.Eng. Diana Băilă, the Coordinator of AMAZE project, from National University of Science and Technology Politehnica Bucharest, Romania and was realized





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the AMAZE project presentation, showing the AGENDA of Summer School, participants' presentation (where participated Mr. Prof. Ionescu Nicolae, Mr. Prof. Zaharia Cătălin and Mr. Prof. Dumitrescu Andrei), main aims, actions, activities and results of the project.

h	Monday 8.07.2024	Tuesday 9.07.2024	Wednesday 10.07.2024	Thursday 11.07.2024	Friday 12.07.2024	Saturday 13.07.2024	Sunday 14.07.2024	Monday 15.07.2024	Tuesday 16.07.2024	Wednesday 17.07.2024
10	Opening ceremony and project presentation	CAD – Lecture (UPB+YFCNU)	Smart (Intelligent) Materials used in architecture (YFCNU)	Enterprise dynamics (workshop)	CAE – lecture (YFCNU)	Progress report (preparing of the interim report for Monday - working on smaller groups)	Progress report (preparing of the interim report for Monday - working on smaller groups)	General progress of W1 and W2	Finalizing progress report, preparing final presentation	Presentations made by students for companies involved in the summer school - evaluation and feedback on behalf of the companies, defining of common ideas of future diploma projects
11	Participants' presentation and program guidelines for summer school	Industrial Design (UPB)	Reverse Engineering (PUT)	Presentation of Leykom Bucharest and Admasy Targu Mures companies from Romania	Developing of VR/AR applications (EDIBON)	Progress report for Monday - working on smaller groups)		Presentation of NUTechnologies company from Timisoara, Romania	Final test, final questionnaires and feedbacks	
12	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time	Lunch & free time
13	Introduction in Additive Manufacturing (UPB)	Workshop 3D / Launching of case studies	Sensors and Electronics (UPB)	Trip at Bran Castle/ Sinaia Castle	Precision and control used for industrial parts	Trip at Black Sea	Trip at Black Sea	Workshop Additive Manufacturing	Finalizing work on assembly, preparing final presentation	Closing and awarding ceremony, future perspectives of AMAZE project
14	Visiting UPB laboratories	Smart (Intelligent) Materials used for industrial products (PUT)	Workshop 3D CAD		Workshop 3D CAE				Final student presentations, live demonstrations, test corrections	
15	Visiting CAMPUS laboratories	Computer Programming (EDIBON)						Case studies particularities and specific tests for the industrial parts		Free time, sightseeing
<b>Week 1</b>						<b>Week 2</b>				





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In the first day, on 8.07.2024 was realized the introduction in Additive Manufacturing, a presentation concerning the new information's about these technologies and 3D printers (Fused Deposition Modeling and Stereolithography) and the students completed the initial tests. Then were made some visits in Politehnica Bucharest laboratories and CAMPUS Research Center laboratories.



In the second day, on 9.07.2024, Yuriy Fedkovych Chernivtsi National University, Ukraine-YFCNU sustained the course about CAD/CAE software (Autodesk Revit) used in architecture and in industry, by Mrs. Prof. Nataliia Vatamaniuk. From Politehnica Bucharest, Mr. Prof. Dumitrescu Andrei presented the course about Industrial Design – Approaches for a definition. After lunch, was started the Workshop 3D CAD, launching of case students. Mr. Prof. Remigiusz Labudzki, and Mrs. Natalia Wierzbicka from Poznań University of Technology - Poland, presented the course about Smart (Intelligent) Materials used for industrial products. From Edibon International S.A. company, Romanian branch from Craiova, Mr. Adrian Popescu presented the Edibon industrial products in Romania and computer programming used for them.

In the third day, on 10.07.2024, were presented the course about Smart (Intelligent) Materials used in Architecture by Mrs. Prof. Borchha Mariana, from Yuriy Fedkovych Chernivtsi National University, Ukraine and the course about Reverse Engineering sustained by Mr. Prof. Remigiusz Łabudzki, from Poznań University of Technology from Poland. After the lunch, was presented the





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course about Sensors and Electronics used in Additive Manufacturing systems, by Mrs. Prof. Băilă Diana, from Politehnica Bucharest and was started the workshop 3D CAD, for the students, to permit realization of the design and stl file for their 3D parts (the guide support, the brewery building, and the case phone).



Mr. Prof.Dr.Eng. Zaharia Cătălin from National University of Science and Technology Politehnica Bucharest, Romania, realized the presentation concerning the Additive Manufacturing used in industrial design, with the title: *“Polymeric Materials in 3D Printing Transforming Manufacturing and Design”*.





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In the fourth day, on 11.07.2024, was realized the Enterprise Dynamics workshop – for virtual reality simulation and the Romanian companies’ presentation from Additive Manufacturing domain. Then were realized a trip at Dracula Castle from Bran and at Peleş Castle from Sinaia, in Romania.

In the fifth day, on 12.07.2024, EDIBON International S.A. company, presented by MS Teams on -line the course about Developing of VR/AR applications, realized by Mr. Eng. Sergio Vizcaino.





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After the lunch, Mr. Prof. Ionescu Nicolae presented the new approaches to Precision and Control. Then was realized the CAE workshop for the students concerning their experimental parts. In the weekend, on 13.07.2024, respectively on 14.07.2024, the students prepare their progress report (preparing of the interim report for Monday, working on smaller groups) and was realized a trip at Constanța, to the Black Sea. The students worked in small groups, being mixed groups of students from each AMAZE project partners, and presented as Team their printed 3D products.





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Monday, on 15.07.2024, were established the general progress of W1 and W2, was realized the workshop Additive Manufacturing, and all three experimental parts designed by the students were printed using a 3D Hybrid Printer ZMorph, and PLA (Polylactic Acid) filament, and Voxelizer software and were discussed the case studies particularities and specific tests for the industrial parts.





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Tuesday, on 16.07.2024, the students finalized the progress report and prepared final presentation, were completed the final tests with questionnaires, finalizing work, and take place the final student presentations, live demonstrations.





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Wednesday, on 17.07.2024, the students were awarded for their presentations, realizing their feedback and defining different common ideas for future diploma projects, and participated from Edibon International S.A. company, a representant from Bucharest branch and was take place the closing and awarding ceremony, future perspectives of AMAZE project.



At the final project was realized the round table discussions about the future potential collaboration and virtual e-learning platform for Additive Manufacturing in Industrial Design with the AMAZE project partners with Mrs.Assoc.Prof.Dr.Eng. Diana Băilă and the event participants, that will present the practical applications developed with the students during the Summer School. All participants, respectively staffs and students assisted to this impressive Summer School, hosted by National University of Science and Technology Politehnica Bucharest, were very interested by the AMAZE courses, workshops and project results.

After that were realized the final conclusions.

More information about AMAZE project - **Agreement number 2023-1-RO01-KA220-HED-000155412** can be found on the following link: [www.amaze2023.eu](http://www.amaze2023.eu).

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18.07.2024, Bucharest, Romania

