Application

Programme	Erasmus+
Action Type	KA220-HED - Cooperation partnerships in higher education
Call	2023
Round	Round 1

Table of contents

Context ... 3
Project Summary ... 4
Applicant organisation ... 5
Partner organisations ... 5
Workpackages summary table ... 6
Project budget summary ... 8
Participating Organisations ... 9
Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO) ... 9
Applicant details ... 9
Profile ... 9
Accreditation ... 9
Background and experience ... 10
Partner Organisations ... 13
CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA) ... 13
POLITECHNIKA POZNANSKA (E10208306 - PL) ... 18
EDIBON International, S.A. (E10060431 - ES) ... 22
Relevance of the project ... 25
Partnership and cooperation arrangements ... 31
Impact ... 34
Workpackage activities ... 36
Work package n°1 Project Management ... 36
Work package ... 39
Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts ... 40
Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts ... 45
Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory ... 51
Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) ... 57
Annexes ... 62
Checklist ... 63
Submission History ... 64

Context

Field	Higher Education
Project Title	European Network for Additive Manufacturing in Industrial Design for Ukrainian Context
Project Acronym	AMAZE

Project Start Date (dd/mm/yyyy)	Project total Duration	Project End Date (dd/mm/yyyy)	National Agency of the Applicant Organisation	Language used to fill in the form
15/09/2023	12 months	14/09/2024	RO01 - Agentia Nationala pentru Programe Comunitare in Domeniul Educatiei si Formarii Profesionale	English

Project lump sum	120 000,00 €

For further details about the available Erasmus+ National Agencies, please consult the following page: List of National Agencies.

Project Summary

Please provide a short summary of your project. Please be aware that this section (or parts of it) may be used by the European Commission, Executive Agency or National Agencies in their publications. It will also feed the Erasmus+ Project Results Platform.

Be concise and clear and mention at least the following elements: context/background of project; objectives of your project; number and profile of participants; description of activities; methodology to be used in carrying out the project; a short description of the results and impact envisaged and finally the potential longer-term benefits. The summary will be publicly available in case your project is awarded.

In view of further publication on the Erasmus+ Project Results Platform, please also be aware that a comprehensive public summary of project results will be requested at report stage(s). Final payment provisions in the contract will be linked to the availability of such summary.

Objectives: What do you want to achieve by implementing the project?

Realization of an European network for additive manufacturing in the field of Industrial Design, in the problematic context of Ukraine, the consortium project consists of 4 organizations, which also includes a university from Ukraine,
The AMAZE project provides the chance for the students and professors in mixing the studying / teaching experience and traineeship mobilities periods abroad, with the main aim of further enhancing the learning outcomes and development of transversal skills.

Implementation: What activities are you going to implement?

Main project activities: * Completion of bilateral agreements; * Creation and implementation of financial monitoring; * Production of minutes (protocols) during each TSN physical and online meeting together with an action plan for the next development and implementation activities; * Involvement and meetings of National advisory board members (NAB); * Quality assurance & internal evaluation strategy and implementation; * Dissemination strategy involving the stakeholders; * Development of IOs.

Results: What project results and other outcomes do you expect your project to have?

The project will achieve the following results: IO1 – AMAZE e-book for developing of complex design industrial parts, IO2 – AMAZE e-toolkit manual for digital learning in producing of complex design industrial parts, IO3 – AMAZE e-learning VR/AR platform, IO4 – AMAZE e-case studies.
-1 open acces book
-1 open acces toolkit manual
-2 academic papers (in journals with high visibility, open-acces) and 2 papers in International Conference open-acces and 1 patent submitting application.

Applicant organisation

OID	Legal name	Country	Region	City	Website
E10208641	UNIVERSITATEA POLITEHNICA DIN BUCURESTI	Romania		BUCHAREST	http://www.upb.ro

Partner organisations

OID	Legal name	Country	Region	City	Website
E10207348	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH	Ukraine	Ukraine	CHERNIVTSI	
E10208306	POLITECHNIKA POZNANSKA	Poland		POZNAN	www.put.poznan.pl
E10060431	EDIBON International, S.A.	Spain		Mostoles	www.edibon.com

Workpackages summary table

Please note that it is recommended to split your projects in a maximum of 5 work packages, including the one on project management.

In this section, please do not add the work package project management already included in the previous section.

Work package id	Title	Number of activities	Grant (EUR)
1	Project Management		23 978,00
2	IO1 - AMAZE e-book for developing of complex design industrial parts	1	20 428,00
3	IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	1	29 256,00
4	IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	1	32 578,00
5	IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	1	13 760,00
Total			**120 000,00**

Project budget summary

This section provides a summary of the estimated project budget. The table is automatically completed taking into account the described work packages and their estimated cost.

Budget Items	Allocated amount (EUR)
Work package n°1 'Project Management'	23 978,00
Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts	20 428,00
Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	29 256,00
Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	32 578,00
Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	13 760,00
Total	**120 000,00**

Distribution of the grant amount among participating organisations

WP	Coordinator (EUR)	Partner 1 (EUR)	Partner 2 (EUR)	Partner 3 (EUR)	Total (EUR)
Work package n°1 'Project Management'	9 750,00	4 478,00	4 875,00	4 875,00	23 978,00
Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts	2 590,00	3 036,00	3 406,00	11 396,00	20 428,00
Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	9 592,00	8 852,00	5 356,00	5 456,00	29 256,00
Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	4 286,00	10 491,00	10 521,00	7 280,00	32 578,00
Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	2 590,00	1 850,00	5 220,00	4 100,00	13 760,00
Total	**28 808,00**	**28 707,00**	**29 378,00**	**33 107,00**	**120 000,00**
Project lump sum (EUR)					**120 000,00**

Participating Organisations

To complete this section, you will need your organisation's identification number (OID). Since 2019, the Organisation ID has replaced the Participant Identification Code (PIC) as unique identifier for actions managed by the Erasmus+ National Agencies.

If your organisation has previously participated in Erasmus+ with a PIC number, an OID has been assigned to it automatically. In that case, you must not register your organisation again. Follow this link to find the OID that has been assigned to your PIC: Organisation Registration System

You can also visit the same page to register a new organisation that never had a PIC or an OID, or to update existing information about your organisation.

Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO)

Organisation ID	Legal name	Country
E10208641	UNIVERSITATEA POLITEHNICA DIN BUCURESTI	Romania

Applicant details

Legal name	UNIVERSITATEA POLITEHNICA DIN BUCURESTI
Country	Romania
Region	
City	BUCHAREST
Website	http://www.upb.ro

Profile

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	Higher education institution (tertiary level)

Accreditation

Accreditation Type	Accreditation Reference
Erasmus Charter for Higher Education	RO BUCURES11

Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

University Politehnica of Bucharest, http://www.pub.ro

Politehnica University of Bucharest is a technical university in Bucharest, Romania, having 200 years of activity, being founded in 1818. Politehnica University is classified by the Ministry of Education as an “Advanced Research and Education University”, and the recognition of the University Politehnica of Bucharest as a very great center of excellence in scientific research with high impact on the social and economic environment. The educational offer, aligned to the Bologna system, includes bachelor's (95 Bachelor’s degrees BSc), master's (176 Master’s Degrees MA) and doctoral programs (14 doctoral schools), as well as continuous training programs. In all fifteen faculties there are research structures, from collectives, groups and laboratories to research centers and platforms. The performance anchored in the socio-economic environment, the international visibility and cooperation as well as the scientific novelty and interdisciplinarity are some of the characteristics of the research environment of the University Politehnica of Bucharest.

The university is a member of European Association for International Education (EAIE), European University Association (EUA), EUA Council for Doctoral Education, CESAER (council of universities of science and technology in Europe), and the Romanian Alliance of Technical Universities (ARUT).
The Politehnica University of Bucharest ranked 3rd in Romania, 417 in Europe and 1156th in the global 2023 rating and scored in the TOP 50% across 59 research topics. The Politehnica University of Bucharest ranking is based on 3 factors: research output (EduRank's index has 14,103 publications and 117,523 citations attributed to the university), non-academic reputation, and the impact of 53 notable alumni. In 2023, the Politehnica University of Bucharest ranked 133rd for architecture and 213th for mechanical engineering.

The Politehnica University of Bucharest ranked 1st for Engineering in Romania and 592nd in the World with 7,897 publications made and 62,508 citations received. Main research topics cover the fields of: Industrial Engineering, Industrial Design, Materials Science, Computer Programming, Mechanical Engineering, Automation and Control engineering, Electronic Engineering, Chemical Engineering, Aeronautical Engineering, Automotive Engineering.

The approximate number of professors that work in University Politehnica of Bucharest is 1600, the approximate total number of employees is 4100, and the approximate students number that study in this prestigious university is 30000. University Politehnica of Bucharest has a tradition of more than 20 years in promoting the European dimension, encouraging students and teaching staff exchanges and cooperation between academic institutions in the participating countries, grace of Socrates, Erasmus+ and EEA programs.

Scientific research, by its creative nature, represents one of the most important methods both in teacher or researcher training and in educating university students in the spirit of innovation, irrespective of study level. In the University Politehnica of Bucharest basic and applied research, as well as innovation, are promoted. The new research strategy aims to create self-sustaining interdisciplinary and multidisciplinary structures, capable of outstanding scientific achievements, integrated within multidisciplinary research centers existing in UPB, as Campus and Precis. Furthermore, it strives to integrate the research results in the exchange of national and international values, to increase its national and international visibility, and also attract and create highly skilled human resources. Opening up to the European and world space of education and research through a steady process of internationalization is one of the major objectives of the university. Currently, the University is involved in the following programs: ERASMUS+, EUROWEB+, GREENTECH, CEEPUS and HORIZON 2020.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

In terms of relevance to this project, the activity of the Faculty of Industrial Engineering and Robotics FIIR is oriented towards the following main themes: Additive Manufacturing, Products Design, CAD/CAM/CAE software, Computer Programming, rehabilitation engineering, Modelling and Simulation, Virtual Reality (VR), Augmented Reality (AR), Corrosion and Surface Protection, micro and mobile robots, Industry 4.0, Special Technologies, Welding Technologies, Environment Management.

Assoc.Prof.Dr.Eng. Diana-Irinel Băilă
Works at FIIR. Main area of scientific research: Additive Manufacturing (Direct Metal Laser Sintering DMLS, Selective Laser Sintering SLS, Fused Deposition Modeling FDM, Stereolithography SLA, Digital Light Processing DLP, Binder Jetting BJ), 3D printing methods, smart (intelligent) materials, industrial engineering, materials characterization methods, design of new structures and topological optimization, coatings, hybrid materials, bionic design, lattice structures, modelling and simulation of processes of new developed products, hybrid manufacturing technology, mechanical testing of parts made using 3D printing technology, rapid tooling methods, reverse engineering. Founding member of the Romanian Additive Manufacturing Association. Had been previously involved in several EEA grants, ERASMUS, POSDRU, INTERERREG IVC, CEEX, CNCSIS. Dr. Diana-Irinel Băilă has an experience like a Project Manager/Researcher/Expert in the mentioned projects and

in this project, she will have the role of Project Manager and Expert/Teacher/Researcher in additive manufacturing.

1-BĂILĂ D, Vițelaru C, Trușcă R, Constantin L, Păcurar A, Parau C and Păcurar R, Thin Films Deposition of Ta2O5 and ZnO by E-Gun Technology on Co-Cr Alloy Manufactured by Direct Metal Laser Sintering, MATERIALS (2021), 14(13), 3666;(Q1) article awarded by UEFISCDI
2-BĂILĂ D, Doicin C, Cotruț C, Ulmeanu M, Ghionea I, Tarbă C, Sintering the beaks of the elevator manufactured by Direct Metal Laser Sintering (DMLS) process from Co-Cr alloy. Journal Metalurgija Croatia, ISSN: 0543-5846, vol. 55(4), pp.663-666, 2016.
3-BĂILĂ D; Păcurar R, Savu T, Zaharia C, Trușcă R, Nemeș O, Górski F, Păcurar A, Pleșa A, Sabău E, Mechanical and Wetting Properties of Ta2O5 and ZnO Coatings on Alloy Substrate of Cardiovascular Stents Manufactured by Casting and DMLS. MATERIALS (2022), 15, 5580. (Q1)

Habil.Prof.Dr.Eng. Nicolae Ionescu
Is Doctoral School Director of FIIR and has a vast experience in education and research in the fields of Additive Manufacturing, Nonconventional Technologies, precision and control, tolerances, hybrid manufacturing technology, industrial engineering.
Expert evaluator ARACIS. Founding member of the Romanian Additive Manufacturing Association and member of Nonconventional Technologies Romanian Association. Had been previously involved in several EEA grants, ERASMUS+, POSDRU, CEEX, PHARE, etc. Director/responsible of UPB in 11 projects; team member for 33 projects.

1-Ociepa-Kubicka A, Rozpondek K, Sasananan M, Tuntitipawan N, Ionescu N, Design Thinking in Innovative Teaching in Industry 4.0, Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie, vol.41, pg 23-34, 2021
2-Serban D, Man E, Ionescu N, Roche T, A TRIZ approach to design for environment, Product Engineering: Eco-Design, Technologies and Green Energy, pg. 89-100, Springer, 2005
3-Ghionea I, Ionescu N, Ghionea A, Ćukovic S, Tonoiu S, Catană M, Jamshed I, Computer aided parametric design of hydraulic gear pumps, Acta Technica Napocensis, vol.60 (1), pg.113-124, 2017.

Prof.Dr.Eng. Tom Savu
Is Director of Manufacturing Engineering Department and has expertise in computer programming, modelling and simulations, CAD/CAM/CAE software, sensors and electronics, Virtual Reality (VR), Augmented Reality (AR). Participate in over 50 European projects (EEA grants, Erasmus+, Tempus, Leonardo da Vinci, FP V, Socrates), as a coordinator/representative of UPB. Coordinator of CTANM research center in UPB.

	As Applicant		As Partner or Consortium Member	
Action Type	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships addressing more than one field (KA200)	1	0	1	1
Strategic Partnerships for higher education (KA203)	33	11	49	17
Partnerships for Digital Education Readiness (KA226)	1	0	6	2
Cooperation partnerships in school education	3	0	7	1
Cooperation partnerships in vocational education and training	1	0	12	6
Cooperation partnerships in adult education	1	0	8	2
Cooperation partnerships in higher education	6	4	24	9
Cooperation partnerships in youth	0	0	5	1

Newcomer organisation	No
Less experienced organisation	No
First time applicant	No

Partner Organisations

Organisation ID	Legal name	Country
E10207348	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH	Ukraine
E10208306	POLITECHNIKA POZNANSKA	Poland
E10060431	EDIBON International, S.A.	Spain

CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA)

Partner organisation details

Legal name	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH
Country	Ukraine
Region	Ukraine
City	CHERNIVTSI
Website	

Profile

Is the organisation a public body?	Yes
Is the organisation a non-profit?	Yes
Type of Organisation	Higher education institution (tertiary level)

Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

Chernivtsi National University named Yurii Fedkovich is one of the oldest classical universities in Ukraine. It is located in a magnificent building of modern Chernivtsi - a complex built in 1864-1882 as the residence of the Metropolitans of Bukovina and Dalmatia according to the project of the famous Austrian architect of Czech origin, Josef Glavka. The residence of the Metropolitans of Bukovyna and Dalmatia is the third Ukrainian object included in the UNESCO World Heritage List, since 2011.
Today, the University has 2 educational and scientific institutes: biology, chemistry and bioresources and physical, technical and computer sciences, 10 faculties: geography; economic; foreign languages; history, political science and international relations; architecture, construction and decorative and applied arts; pedagogy, psychology and social work; mathematics and computer science; philological; faculty of physical culture and human health, law; college.
Training of more than 14,000 students of higher education is carried out at 85 departments in specialties at: bachelor's level – 81; master's degree - 73; scientific level - 11.
The educational process and scientific work are provided by 1,100 teachers, including 160 professors, doctors of science and almost 750 associate professors and candidates of science.
The University has post-graduate and doctoral programs, 9 specialized academic councils (of which 5 are doctoral). To date, the training of higher education applicants for the degree of doctor of philosophy was carried out in 19 licensed specialties; doctor of sciences - in 12 specialties.
Scientific research, by its creative nature, is one of the most important methods both in the training of teachers and researchers, and in the education of university students in the spirit of innovation, regardless of the level of education. At Chernivtsi National University, they promote fundamental and applied research, as well as innovation.

The Faculty of Architecture, Construction and Decorative and Applied Arts was established in 2013. The faculty was created with the aim of training highly qualified specialists who will ensure the implementation of engineering-constructive, architectural-design and design solutions
The training of specialists at the bachelor's and master's levels is carried out at: departments of city planning and urbanism and architecture and conservation of UNESCO heritage sites - under the Architecture and Urban Planning educational program; Department of Construction - under the Construction and Civil Engineering program; department of decorative and fine arts - Fine arts, decorative arts, restoration. A total of 585 students study at the faculty. The Faculty of Architecture, Construction, Decorative and Applied Arts has close international ties with relevant institutions in Poland, Austria, Germany, and Romania. In particular, as part of the German-Ukrainian cooperation project of higher education institutions Chernivtsi - Lübeck "Partnership within the framework of the historical part of the city" (German Academic Exchange Service DAAD, 2013-2017, a program of practical training of students for the restoration of the old part of the city of Chernivtsi was implemented
Since 2019, the International ERASMUS+ project has been implemented with the Technical University (Lübeck, Germany). Currently, a memorandum has been signed with the Technical University (Lübeck, Germany) (March 26, 2019) on further cooperation with the intention of submitting a new project "International Mobility and Digital Cooperation" to the DAAD.
Since 2018, a new ERASMUS+ project has been implemented with partners of the Brandenburg University of Technology in Cottbus (Germany).
Cooperation agreements on the mobility of teaching/research staff and students have been concluded with "Gherghe Asachi" Technical University of Iași (Romania), National University "George Enescu" of Arts from Iași (Romania).

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

The Faculty of Architecture, Construction, Decorative and Applied Arts is focused on the introduction into the educational process of additive manufacturing, design softwares, energy-efficient and energy-saving technologies, 3D-digital technologies, methods of restoration and transformation of the historical and modern urban environment by means of architecture, preservation of World Cultural Heritage sites, as well as scientific research in study of the structure, physical and chemical processes of the formation of ultra-high strength concrete composites.
The study of X-ray diffraction phenomena in heterogeneous crystals and systems is of a fundamental nature, since the field of application of these structures occupies an important place in modern scientific materials science due to their extraordinary properties

1- Dean Prof. Doctor of Physical and Mathematical Sciences Igor Mykhailovych Fodchuk
Field of work: theoretical and experimental studies of X-ray scattering by complex crystalline compounds; development of theoretical foundations of multilevel processing of experimental X-ray and electronic signals using genetic algorithms and artificial neural networks; creation of new original non-destructive methods of quantitative assessment of structural heterogeneity of multi-component crystalline compounds, thin films, highly dispersed materials, ultra-strong concrete composites, as well as methods of express control by physico-chemical nanoprocesses of structural phase changes, built on the basis of X-ray diffractometry, electron-raster and atomic and magnetic force microscopy.
1-Igor Myckailovych Fodchuk, Oleksandr Sumariuk, Volodymyr Romankevych, X-ray diffraction of concrete composites of

high structural strength and density, Physics and Chemistry of Solid State, 2021, Vol. 22(4), pg.746-749.
2-Brus V.V., Maslyanchuk O.L., Solovan M.M., Maryanchuk P.D., Fodchuk I.M., Gnatyuk V.A., Vakhnyak N.D., Melnychuk S.V., Aoki T, Graphene/ semi-insulating single crystal CdTe Schottky-type heterojunction X- and γ-Ray Radiation Detectors, Scientific Reports (Nature), 2019, Vol. 9(1), 1065. (Q1-I.F. 4.25)
3-Fodchuk I.M., Balovsyak S.V., Novikov S.M., Yanchuk I.V., Romankevych V.F, Reconstruction of spatial distribution of strains in crystals using the energy spectrum of X-ray Moiré patterns, Ukrainian Journal of Physical Optics, 2020, Vol. 21(23), pg. 141-151.

2-Assistant PhD technical sciences Yurii Sobko
Field of work: diagnostics of building materials and structures and technological and organizational solutions for the method of lifting large-sized coatings with load-lifting installation modules.
1-Hennadii Tonkacheiev, Volodymyr Rashkivskyi, Liubov Lepska, Serhii Sharapa, Yuri Sobko, Prerequisites for the creation of lifting and collecting technological module for the installation of structural blocks of the coating, Ad Alta: journal of interdisciplinary research (The Czech Republic), 2022, Vol. 12, pg. 204-206 (WOS)
2-Yu.T. Sobko, O.V. Sumaryuk, K.V. Chernenko, Development of microstructure and hydration processes of concrete composites for structures with increased durability, Ways to increase the efficiency of construction in the conditions of the formation of market relations, 2022, Vol 49(1), pg. 38-48. (Professional journal of Ukraine)
3-V.K. Chernenko Yu.T. Sobko, Complex mechanization of structural coverage lifting using setting module (VPVM), MOTROL Motoryzacja i Energetyka Rolnictwa, Polish Academy of Sciences, 2016, vol. 18(10), pg.93-99.

3-Assistant PhD student Romankevich Volodymyr Frantzovich
Field of work: physicochemical nanoprocesses of structural relaxation and aging of high-strength concretes with complex modifiers of the new generation and methods of their diagnosis
Mr. Romankevich Volodymyr Frantzovich has numerous articles published on the research of composite materials in the journals Nanosystems, Nanomaterials, Nanotechnologies and in Physics and Chemistry of Solid State.

	As Applicant		As Partner or Consortium Member	
Action Type	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships for higher education (KA203)	0	0	2	0
Partnerships for Digital Education Readiness (KA226)	0	0	1	1
Cooperation partnerships in school education	0	0	1	1

Newcomer organisation	No
Less experienced organisation	Yes

Would you like to make any comments or add any information to the summary of your organisation’s past participation?

Types of equipment:
- Hydraulic press TestMAK 2000 kN.
- Drying cabinet CHO 250/350
- Detektor Bosh D-Tect Professional
- Video endoscope
- pH meter
- Metabo compressor
- Mixer LB160B
- Breaking machine SZ-10-1 (force 5t)
- Thermal imager Testo 875-1i
- Thermodetector Testo 830T1
- Thermoanemometer testo 425 with a telescopic probe - is used to measure ultra-low air velocities (from 0.03 m/s).
- CO detector testo 317-3 is a portable gas analyzer for monitoring the CO concentration in the air (up to 0.2% CO) with optical and audible alarm signals.
- Testo 410-2 multifunctional anemometer
- Testo 635-2 thermal conductivity - extended kit for measuring the thermal conductivity of materials.
- Parrot Anafi Thermal quadrocopter with thermal imaging - for non-contact determination and visual presentation of temperature distribution on surfaces at high points of buildings.
- 3D printer Prime X with 2 extruders – for printing 3D plastic models.
- testo 440 kit for measuring illuminance - luxmeter testo 440
- Laboratory weight up to 6 kg.
- Laboratory weight up to 50 kg.
- Leica DISTO D2 laser tape measure 3 pcs
- Leica DISTO D5 laser protractor – for measuring facades, construction details.
- Tripod for NANOMAX 460 RW20 protractor
- Moisture meter WIP-24 – for quick, non-destructive measurement of the moisture level
- Hygrometer WIP-24
- Moisture meter CM TESTER
- Schmidt device type NR - for measuring the strength of building structures with a thickness of more than 10 cm by the method of elastic rebound.
- Ultrasonic strength measuring device IPSM-U+T+D
- Kashkarov's hammer
- Zeiss-Ni30 optical level
- SOKKIL B40 optical level

- Zeiss optical theodolite
- Geodetic line.
- Vic's device
- Le Chatelier flask
- Freezer up to - 500C
- Diamond installation of elektrowerkzeuqe GmbH Eibenstock

The researches of this University are interested to create new competitive nanomaterials for creating highly efficient structures. Concrete composites, whose compressive strength is about 150 MPa, are resistant to aggressive environments and the penetration of alpha and gamma rays. Structural phase changes that occur at the nano-level structure of the cement matrix require a deeper study of the structure, physical-chemical processes of the formation of ultra-high strength composites.
Artificial composites of ultra-high structural strength and density based on nanosilica and nanosilicon nanomodifiers. New approaches to the chemical modification of the cement matrix pose the tasks of substantiating the cause-and-effect relationships of the structure formation processes and quality control of the source material, which is a necessary condition for obtaining high-strength composites.
The study of X-ray diffraction phenomena in heterogeneous crystals and systems is a fundamental nature, since the field of application of these structures occupies an important place in modern scientific materials science due to their extraordinary properties.

POLITECHNIKA POZNANSKA (E10208306 - PL)

Partner organisation details

Legal name	POLITECHNIKA POZNANSKA
Country	Poland
Region	
City	POZNAN
Website	www.put.poznan.pl

Profile

Is the organisation a public body?	Yes
Is the organisation a non-profit?	No
Type of Organisation	Higher education institution (tertiary level)

Accreditation

Accreditation Type	Accreditation Reference
Erasmus Charter for Higher Education	PL POZNAN02

Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

Poznan University of Technology (PUT) was established in 1919 as a technical school. Currently, it is one of the leading technical universities in Poland.
In 1995 PUT, as the first Polish University of Technology, became a member of the Conference of European Schools for Advanced Engineering Education and Research – CESAER-bringing together the best European Engineering Colleges and Universities of Technology. In 1999 PUT was the host organization of the IX CESAER Conference.
In the academic year 1999 / 2000 European Credit Transfer System –ECTS-was introduced at the PUT.
PUT trains highly qualified personnel in the field of broadly defined engineering. PUT has nearly 21 000 students across 10 faculties and education is provided in 33 fields of study. Poznań University of Technology is known as one of the best technical universities in Poland. URAP ranked PUT as in top 6% of world universities and Webometrics ranked it at no. 842 in the world by Google citations for the year 2015. In 1995 it became the first Polish university to become a member of the Conference of European Schools for Advanced Engineering Education and Research (CESAER), an organization comprising the best technical universities in Europe. The university is also a member of the Socrates-Erasmus programme for exchange students from all over Europe, promoting advanced engineering and a European dimension. The university is home to many organizations and student circles, and the radio station Afera 98.6 MHz.
PUT takes an active part in scientific exchange and international projects and cooperates with many companies and research institutions both in Poland and abroad – the University
has entered about 230 international agreements with universities in Europe and outside. PUT was the first Polish university accepted into the circle of members CESAER (Conference
of European Schools for Advanced Engineering Education and Research) - the European association of the best technical universities.

The Poznan University of Technology (PUT) are ten faculties: Mechanical Engineering and Management, Architecture, Chemical Technology, Computing, Electrical Engineering, Electronics and Telecommunications, Engineering Management, Machines and Transportation, Technical Physics and Civil and Environmental Engineering.
Students from the Faculty of Computer Science started few times in CSIDC computer systems projecting world championships organised by Institute of Electrical and Electronics Engineers (IEEE) Computer Society and ImagineCup (Microsoft). Four different teams in 2001–2006 managed by Doctor of Engineering Jan Kniat were three-time world champions. Many graduates from Computer science and Management faculty work in Microsoft corporation in Redmond, Washington, US. PUT is a member of CESAER Association and was the first Polish technical university to receive membership of that organisation.

The Faculty of Mechanical Engineering was established in 1919 - the first, original faculty in the Higher School of Mechanical Engineering. The fields of study offered by the Faculty, which include Mechanical Engineering, Management and Production Engineering, Mechatronics and Biomedical Engineering, allow students to follow degree programmes covering the broadly understood mechanical engineering area - construction, technology, automation, diagnostics and computerization, management and production engineering. Mechatronics students gain expertise which combines several areas of knowledge and skills and Biomedical Engineering students acquire knowledge in the area of construction and operation of medical devices and prosthetics. The Faculty has the right to confer doctoral and postdoctoral degrees of technical sciences in the discipline of mechanical engineering. There are currently four institutes operating at the Faculty.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

Faculty of Mechanical Engineering developes activities that are compatible with activities foreseen to be developed within the AMAZE project proposal, such as:
-Stability and optimization of thin-walled shell structures
-Application of information technologies and experimental data in vibroacoustics of biomechanical systems,
-Mechanics of smart materials and structures,
-Construction, technology and testing of technological machines,
production and control mechatronic equipment, Automation of production stands and processes,
-Human-machine communication by voice, haptic joystics, vision systems, wireless control, RFID elements etc.
-Contact and optical coordinate measurement, including dynamic measurement of deformations by optical scanner,
-Thermovision measurement of various objects thermal state,
-Roughness and topography measurement, including nano scale,
-Measurement of form errors with nanometric resolution by interferometric, holographic and shearographic methods,
-Examination of materials mechanical and tribological properties
-Testing of chemical composition, thickness and adhesion of wear resistant coatings,
-Diffraction studies and solid materials using powder X-ray: phase analysis, qualitative, quantitative measurement of the crystallite size and parameters of the network and the low angle diffraction SAXS
-Accelerated corrosion tests based on the polarization curves,

-Kinetics and mechanisms of electrochemical corrosion of mechanical materials,
-Early detection of the sharkskin instability during processing
-DSC testing of polymeric materials and composites,
-Determination of thermal effects of changes i.e. exothermic or endothermic.
The Faculty of Mechanical Engineering participated in very much Erasmus+, Horizon, EEA Norway grants, etc.

Ph.D. Remigiusz LABUDZKI - Assistant Professor in Department of Technology Planning at Faculty of Mechanical Engineering. Articles published: R. Labudzki, R. Talar, F.
Sarbinowski, A. Patalas, A numerical and experimental study of the energy absorption capacity of auxetic structures manufactured with additive technology. Proceedings of the 6th
International Conference on Integrity-Reliability-Failure IRF 2018 (Lisbon/Portugal, 22-26 July 2018) / red. Silva J. F. Gomes, Shaker A. Meguid: INEGI-FEUP, 2018; R. Labudzki, J.
Leopold: Application a machine vision system in labeling machines. 6th International Conference of Applied Science : book of abstracts - Banja Luka, Serbia : University of Banja Luka
Faculty of Mechanical Engineering, 2018; F. Sarbinowski, R. Labudzki, R. Talar, A. Patalas: Application of a vision system to determine the Rayleigh damping coefficients of materials
used in stereolithography. IOP Conference Series: Materials Science and Engineering - 2018, vol. 393; R. Labudzki, S. Legutko, P. Raos: The essence and applications of machine
vision. Tehnički Vjesnik - Technical Gazette - 2014, vol. 21, no. 4.

Prof. hab. Rafał TALAR - Head of Institute of Mechanical Engineering. Professor in Department of Technology Planning at Faculty of Mechanical Engineering. Articles published: R. Labudzki, R. Talar, F. Sarbinowski, A. Patalas, A numerical and experimental study of the energy absorption capacity of auxetic structures manufactured with additive technology. Proceedings of the 6th
International Conference on Integrity-Reliability-Failure IRF 2018 (Lisbon/Portugal, 22-26 July 2018) / red. Silva J. F. Gomes, Shaker A. Meguid: INEGI-FEUP, 2018; R. Labudzki, J.
Leopold: Application a machine vision system in labeling machines. 6th International Conference of Applied Science : book of abstracts - Banja Luka, Serbia : University of Banja Luka
Faculty of Mechanical Engineering, 2018; F. Sarbinowski, R. Labudzki, R. Talar, A. Patalas: Application of a vision system to determine the Rayleigh damping coefficients of materials
used in stereolithography. IOP Conference Series: Materials Science and Engineering - 2018, vol. 393.

	As Applicant		As Partner or Consortium Member	
Action Type	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Strategic Partnerships for higher education (KA203)	5	1	15	6
Partnerships for Digital Education Readiness (KA226)	1	1	3	1
Cooperation partnerships in higher education	4	3	3	0
Cooperation partnerships in vocational education and training	0	0	1	1

Newcomer organisation	No
Less experienced organisation	No

Would you like to make any comments or add any information to the summary of your organisation's past participation?

PUT is the leader of the EUNICE - European University for Customized Education (2021-2024) project (www.eunice-university.eu) as part of a consortium of European universities: Brandenburg University of Technology (BTU) – Germany, University of Cantabria (UC) – Spain, University of Catania (UNICT) – Italy, University of Mons (UMONS) – Belgium, Université Polytechnique Hauts-de-France (UPHF) – France, University of Vaasa (UVA) – Finland

EDIBON International, S.A. (E10060431 - ES)

Partner organisation details

Legal name	EDIBON International, S.A.
Country	Spain
Region	
City	Mostoles
Website	www.edibon.com

Profile

Is the organisation a public body?	No
Is the organisation a non-profit?	No
Type of Organisation	Small and medium sized enterprise

Background and experience

Please briefly present the organisation (e.g. its type, scope of work, areas of activity and if applicable, approximate number of paid/unpaid staff, learners).

Edibon is a worldwide benchmark company, with 40 years of experience in teaching equipment for engineering and in 14 technical education areas. The company strategy based on continuous Research and Development (R&D) allows us to have nowadays more than 4,000 products developed and designed by us, manufactured with the most advanced technology and complying with international quality standards. Thanks to our human resources and their knowledge, we can offer a personalized and comprehensive service that covers the design, manufacture, installation, maintenance and advice of all our products, thus offering a guarantee of success and full satisfaction of our customers.
The company mission is to create the best product with the latest technology available in the market. Excite our clients from around the world with the best technical teaching equipment available and offer them at all times an excellent after-sales service.
The company vision is to consolidate the company's leadership worldwide. Offer all the necessary tools for a quick, easy and effective training of students and teachers.
The company values consist on the creation of a culture of responsibility, respect, equality, perseverance and environmental protection. To do this, we try to convey our values to employees, customers and representatives from all over the world.

What are the activities and experience of the organisation in the areas relevant for this project? What are the skills and/or expertise of key persons involved in this project?

Edibon team is made up of 120 highly qualified professionals, including more than 50 engineers with extensive know-how that allows us to offer a personalised and comprehensive service to our customers.
EDIBON is a design and manufacture Technical Teaching and Research Equipment in the field of Engineering, with the most Advanced Technology and optimized instructive techniques, for more than 40 years.
EDIBON is committed to offer our expertise in the sector to any Technical Education Center (public and private).
Edibon products are realized in the next domains: Mechatronics, automation and compumechatronics, mechanics, biomedical engineering, electronics, electricity, process control, chemical engineering, thermodynamics and thermotechnics, physics, communications, environment, food and wáter technologies.
In Europe, more than 45 countries use EDIBON technology, in America than 34 countries used this technology, in Asia 42 countries, in Africa 50 countries and in Oceania 4 countries.

	As Applicant		As Partner or Consortium Member	
Action Type	Number of project applications	Number of granted projects	Number of project applications	Number of granted projects
Cooperation partnerships in school education	0	0	1	0
Cooperation partnerships in vocational education and training	0	0	1	1

Newcomer organisation	No
Less experienced organisation	Yes

Would you like to make any comments or add any information to the summary of your organisation's past participation?

The Edibon company has lines of business: Day by Day, Technical Education Consultancy, Technical Courses, Projects, Technical Distance Learning (ECL), Construction of Buildings for Technical Education, Custom-Made: Units and Pilot Plants, Complete Laboratories, Technical Education Turnkey Projects (TKP). Some of EDIBON company customer and partners are: HARVARD University, Massachusetts Institute of Technology, Charles Darwin University, Novosibirsk State University, Ecole Polytechnique Federale de Lausanne, Singapore Institute of technology and thousands customers in more than 150 countries.

CÉSAR BONILLA GARCIA
II.- ACADEMIC BACKGROUND
• 1994-2000 Superior Industrial Engineer (specialising in Electronics)
University Alfonso X, Madrid, Spain
• Specialist in Electricity and Mechanics.
IV.- COURSES AND SEMINARS
2009 Implementation in the companies of the LOPD Course.
2007 Data Visualization Screens Prevention Course.
General Security Risks, of the Commerce Sector, Office Sector and Basic Level Prevention
Course.
Psychosocial Factors Course.
Telephone Assistance Course.
2006 Simulation and Demonstration of the use of Fire Extinguishers Course.
Environmental Training Course.
2004 Current Quality Policy Course.
1999 WEB Programming Course.
1998 Databases Creation and Management Course.
V.-COMPUTER KNOWLEDGE
Various computer skills: structure of computers, operating systems, Microsoft Word, Microsoft Excel, Microsoft Access, Corel Draw, Autocad, C ++ programming, Windows NT network administrator, etc
VI.- WORK EXPERIENCE
1993 - Opening of a branch of the EDIBON company in Miami, USA.
1996 - Beginning of the collaboration, that still remains until today, in the design of units in different technical areas (Fluid Mechanics, Electronics, Chemistry, etc.) in the EDIBON company.
1999-2010 - Assistance as a technician of the EDIBON company to international fairs and exhibitions.

- Responsible for the Quality Control Department of the EDIBON company, establishing test instructions for different units and quality assurance systems.
- Responsible for the Manufacturing Department in the establishment of work guidelines and equipment documentation systems. List of the different installations, commissioning and trainings related to Technical Teaching
Equipment, among others:
- Implementation and training of several laboratories, at the National University of Asunción (U.N.A.) in Paraguay, in the School of Engineering and Chemistry.
- Installation and commissioning of Hydrological Systems Simulation units for doing research at the New York City College (USA). Training course for engineers and teachers, related to Data Acquisition and Control Systems (in the same university).
- Installation, commissioning and training of several laboratories at Anna University in India.
- Installation, commissioning and training of Chemical Engineering laboratory in the University of Praire View, in Texas, USA.

Relevance of the project

Priorities and Topics

All project proposals under the Erasmus+ Programme should contribute to one or more of the programme's policy priorities.

Please select the most relevant priority according to the objectives of your project.

HE: Supporting Higher Education institutions in their cooperation with Ukrainian counterparts to respond to the war in Ukraine

If relevant, please select up to two additional priorities according to the objectives of your project.

HE: Supporting digital and green capabilities of the higher education sector

HE: Promoting inter-connected higher education systems

How does the project address the selected priorities ?

In this period, Ukraine suffers from the brutal, genocidal and large scale military aggression by russian federation, the aggressors troops are attacking Ukrainian cities, shooting civilians, kidnapping, raping kids, women and men, bombarding kindergartens, schools, universities, hospitals, cultural centers etc. Students, young people, academics and researchers are dying defending civilization, nation and values. Ukrainian universities pay a high price, during genocidal war of Russia against Ukraine nation. In these period access of the teachers, students, researchers and academics to job is limited/absent. Universities contacts and documents – not available/ destroyed/relocated. Educational institutions infrastructures for digital/blended education – partially not available/destroyed/relocated, payments are under delay. Every day Ukrainian youth, students and staff are dying defending Ukraine and Europe with bravery instead of enjoying life, studying, living and Erasmusing. the most relevant priority according to the objectives of your project
The AMAZE Erasmus+ project objectives is to redesign activities to respond challenges, in which universities strengthen their internationalisation priorities, supporting digital and green capabilities of the higher education sector and promoting inter-connected higher education systems.
The project and partnership needs are (overall and target groups): a) It is of crucial importance that students and practitioners in the field of industrial engineering, are, just in time introduced to the novel methods applicable in industry. b) Connection and collaboration between scientists, engineers, students are very important in order to properly acquire required knowledge and to develop and implement new design and engineering methods. c) The Quadruple Helix Model of innovation recognizes four major actors in the innovation system: science, policy, industry, and society. In keeping with this model, more and more governments are prioritizing greater public involvement in innovation processes. d) During the war period it become clear how important is to acquire industrial resources and knowledge (e.g., HEIs) fast and reliable.
e) To implement better educational process in HEIs, which is tailored to the requirements of the specific student or groups and based on novel learning methods. f) To reduce HEIs costs: less of expensive mobility, easier access to modern technologies, less overall expenditures for university, availability of highly skillset (the best in Europe), etc.
g) To improve HEIs capabilities in providing learning for people with specific disabilities. h) To upgrade and innovate existing curriculums, and to make a template for future development of contemporary educational material in the field of industrial engineering and other fields of science and technology i) To enable development of specific courses required by industry, companies and interested society entities, like National Employment Agencies

Please select up to three topics addressed by your project

Digital skills and competences

Science, technology, engineering and mathematics (STEM)

Information and communication technologies (ICT)

Project description

Please describe the motivation for your project and explain why it should be funded.

During the AMAZE project it is foreseen to provide the chance for the students and professors in mixing the experience provided by studying / teaching and traineeship mobilities periods abroad, with the main aim of further enhancing the learning outcomes and development of transversal skills.
Therefore the main benefits of having Higher education student and staff mobility between Yurii Fedkovich Chernivtsi National University (Ukraine) and the other institutions Politehnica University of Bucharest (Romania), Poznan University of Technology (Poland) and the private company Edibon (Spain) will provide gaining of experience and expertise by:
-exposing students and professors to different views, knowledge, teaching and research methods as well as work practices in their study field; -developing of transversal skills such as communication, language, problem solving, inter-cultural skills and research skills; -developing of forward looking skills, such as digital skills, that will enable the students and professors to tackle the challenges of today and tomorrow; -facilitating of personal development such as the ability to adapt to new situations and self-confidence.
In terms of cooperation and partnership between the education and the world of work, the main benefit for the students and professors which will be involved in the AMAZE project will consist mainly in: -experiencing of new teaching environments and new modern teaching methods; -acquiring of new innovative pedagogical and curriculum designing skills and digital skills; -connecting with their peers abroad to develop common activities to achieve the program objectives; -exchanging and sharing of good practices of the AMAZE consortium to enhance cooperation between higher education institutions; -better preparing of the students for the world of work by involving staff from enterprises in courses.
It is important to mention that the opportunities and challenges of global mobility has for today's changing workforce significantly.
Basically there were three major trends that have changed the nature of work today, such as:(1) an increasingly global and complex inter-dependent economy,(2) changing demographics within the workforce, with skill shortages in some places and skill surpluses in others, and (3) rapid technological changes.
The most relevant propriety according to the objectives of AMAZE project is Supporting Higher Education institutions in their cooperation with Ukrainian conterparts to respond to the war in Ukraine, being involved as partner a prestigious and one of oldest classical university from Ukraine, The Yurii Fedkovich Chernivtsi National University, that aim of training highly qualified specialists who will ensure the implementation of engineering-constructive, architectural-design and design solutions. The three topics consist in Digital skills and competences, Science, technology, engineering and mathematics and quality and information and communication technologies.

What are the objectives you would like to achieve and concrete results you would like to produce? How are these objectives linked to the priorities you have selected ?

Main objectives of the project are: * To form a knowledge triangle network which will enable inter-connection between education, innovation and business in order to enable knowledge transfer and sustainability of the promoted system (E-AMAZE platform), and to provide capabilities for constant upgrade of learning techniques. * To apply STEM philosophy in NEM and to develop and/or upgrade courses and curriculums based on STEM principles and other applicable educational (learning) methods. * Development, testing and adaptation of existing and novel learning and teaching methodologies and pedagogical approaches. * Delivering and enhancing key competences and skills through education and collaboration, and focusing on the use of modern ICT and related technologies in the field of industrial engineering. * Development, testing and application of flexible learning pathways and modular course design (online) and appropriate forms of assessment, including the development of online assessment. * Enabling lifelong learning in higher education, including facilitating the initiation, validation and recognition of short blocks of training leading to micro-credentials. * Development of online pedagogical approaches, including transdisciplinary approaches, new curriculum design, delivery methods and assessments * Fostering an entrepreneurial, open and innovative higher education sector, by promoting learning and teaching partnerships with commercial and non-commercial organizations in the public and private sector. * Development of new practices in teaching design, based on educational research, innovation and creativity. * Improve learning capabilities of students with disabilities by using developed learning methods and E-AMAZE platform. The subject of the project responds to a particularly current problem, with direct practical relevance, especially regarding the optimization of the use of resources. The search for intelligent forms, inspired by nature, easily adaptable, is of utmost importance. Through the use of new design/digital design software, such as GD, the realization and production of such surfaces becomes a reality. It is necessary to emphasize that generative design and its procedures are infinitely more efficient and effective than conventional CAD, CAE, CAM methods; In addition, internationally, the idea of incorporating material behavior into generative design is in its infancy. The project objectives will consists in teaching the students, Additive Manufacturing, Design and Industrial Technology, fields of interest and future, which are particularly in demand on the labor market in the world

What makes your proposal innovative?

The innovative and originality aspects of the AMAZE project include:
-providing of excellent opportunities for early-stage researchers in the EU and Ukraine to be scaled up through the multi-disciplinary research in the AMAZE project so as to develop versatile skills and own independent research careers. -bringing together under the umbrella of AMAZE European network of multi-disciplinary partners from design, industrial engineering technologies and additive manufacturing domains to work in a coherent manner to carry out international cooperation (EU and Ukraine institutes), to develop knowledge exchange networking, to investigate technical solutions of

conceiving, developing and realizing of different industrial products with complex design that are about to be produced by Additive Manufacturing technologies, and to organize research outreach activities to companies/organization stakeholders. - examining of the effectiveness of the AMAZE solutions through case studies from the European and Ukrainian partners. Other innovative aspects of AMAZE consortium are: the e-book and e-toolkit realization for Assisted Learning that will enable for Ukrainian staff and students to pass this difficult period. The research teams in this consortium represent a wide geographic spread across EU and Ukraine. AMAZE network will be therefore one valuable resources for research dissemination to create extensive impact for all institutions involved.
In the educational programs of the universities in Romania, Ukraine and other universities, the study of the disciplines regarding the use of additive manufacturing technologies in industrial engineering, in design, in architecture is completely missing or appears only as a discipline optional or facultative, although the rapid development of these technologies led to the third industrial revolution, being the technologies of the future. The AMAZE project aims to teach and study additive manufacturing, being a must-have of the moment.

How is this project complementary to other initiatives already carried out by the participating organisations?

University Politehnica of Bucharest, Poznan University of Technology and Yurii Fedkovich Chernivtsi National University participated in very many Erasmus+ projects, as Strategic Partnerships for Higher Education (KA203), Partnerships for Digital Education Readiness (KA226), Cooperation partnerships in school education (KA220-SCH), Cooperation partnerships in higher education (KA220-HED), having a greater experience, human resources (professors, researchers, students) and materials possibilities for Erasmus+ projects progress. All universities partners and EDIBON company were involved in various research projects as, Horizon 2020, EEA & Norway grants, PNCDI projects, etc.
Complementary projects that were realized in University Politehnica of Bucharest are:

1- The PN-II-PT-PCCA-2013-4 project with the title “New intelligent design solutions”- SmartMat is addressed to optimizing the use of resources for the complex structure. Solutions for increasing the degree of safety, hygiene and comfort conditions of living and for optimizing the use of resources that ensure the quality of living. The project proposes an applied research, with the general objective of solving some of the most topical problems at national and international level regarding the optimization of resources (materials, energy, time) by creating free-form applications/modules, using intelligent digital tools and digital manufacturing, exhibiting the material properties, for the field of civil/architectural constructions.
2-The project with the title “Designing an Erasmus Mundus Master on Digital and Sustainable Manufacturing”- Des4SusMan aims to develop a 2-y joint MSc on Digital and Sustainable Manufacturing for training students in the fields of mechanical, manufacturing engineering. The complementarity of AMAZE project consists in the new Additive Manufacturing technologies that will used for producing the industrial parts with complex design, using CAD, CAM, CAE methods for designing.

How is your proposal suitable for creating synergies between different fields of education, training, youth and sport or how does it have a strong potential impact on one or more of those fields?

The AMAZE proposal is suitable for creating synergies between different fields of education, training, youth and sport or it has potentially a strong impact on one or more of those fields, because young students, teachers, researchers are involved who will participate in various training and education courses in the field of Industrial Engineering, regarding the design and use of new additive manufacturing technologies in order to make industrial products with complex shapes. Also, within the mobility of students and teaching staff within the Summer School, respectively the training, the courses and laboratories will be combined with socialization, companies visiting and the development of new partnerships and projects.
The AMAZE proposal suitable has a strong potential impact on one or more of those fields: education, training, youth and sport, to achieve defined priorities following will be done: * The one of the goals of the project is development, testing and adaptation of existing and novel learning and teaching methodologies and pedagogical approaches, delivering and enhancing key competences and skills through education and collaboration, and focusing on the use of modern ICT and related technologies in the field of medical engineering. * Development, testing and application of flexible learning pathways and modular course design (online) and appropriate forms of assessment, including the development of online assessment; * Enabling lifelong learning in higher education, including facilitating the initiation, validation and recognition of short blocks of training leading to micro-credentials. * Development of online pedagogical approaches, including transdisciplinary approaches, new curriculum design, delivery methods and assessments * Fostering an entrepreneurial, open and innovative higher education sector, by promoting learning and teaching partnerships with commercial and non-commercial organizations in the public and private sector; * Development of new practices in teaching design, based on educational research, innovation and creativity. * The current overview of STEAM fields requirements for industrial engineers states that different specific sub fields must be implemented, like: Geometrical Modelling, Virtual Reality, Artificial Intelligence, Smart (Intelligent) Materials, Industrial Engineering, etc. The objective of this project is to develop an AMAZE platform (IO3) which will enable integration of knowledge and experience from different fields. * Forming knowledge network for enabling direct connection and collaboration between HEIs.

How does the proposal bring added value at European level through results that would not be attained by activities carried out in a single country?

The AMAZE proposal brings added value at the European level through results that would not be achieved through activities carried out in a single country, because all partners have their educational and research experience, which will be shared during the project's activities in order to improve the activities educational and research, for all the institutions involved in the

project and for obtaining innovative results in the fields of industrial engineering, additive manufacturing and design.
Other added value at European level through results of the AMAZE consortium project plans training, teaching or learning activities:
• the quality of practical arrangements, management and support modalities in learning, teaching and training activities;
• the quality of arrangements for the recognition and validation of participants' learning outcomes, in line with European transparency and recognition tools and principles.
• the project is designed in an eco-friendly way and incorporates green practices in different project phases.
The AMAZE project involves an appropriate mix of participating organisations in terms of profile, including grassroots organisations, past experience in the Programme and expertise to successfully complete all project objectives. The project has newcomers and less experienced organisations to the Action, as Yurii Fedkovich Chernivtsi National University from Ukraine and EDIBON. The proposed allocation of tasks demonstrates the commitment and active contribution of all participating organisations.
The proposal includes effective mechanisms for coordination and communication between the participating organisations, as well as with other relevant stakeholders. The AMAZE project involve of a participating organisation from a third country not associated to the Programme brings an essential added value to the project, the Yurii Fedkovich Chernivtsi National University, grace of specialists in Design, Additive Manufacturing, materials analysis domains

Needs analysis

What needs do you want to address by implementing your project?

Students from Ukraine, who have certain restrictions regarding attending courses during the war and cannot have a normal access to education, now grace of AMAZE project, can develop their digital skills, as well as 3D modeling and manufacturing skills of complex products. The educational processes for students and industry engineers in Ukraine don't have possibilities to updating and applying novel learning methods, such are: NEM (Novel Educational Methodology), STEM (Science, Technology, Engineering, Mathematics) and innovative ICT technologies. The students needs to learn new design CAD/CAM/CAE (Computer-Aided Design/Computer-Aided Manufacturing/Computer-Aided Engineering) software that permit 3D modelling and FEA (Finite Element Analysis) simulation of the industrial complex parts and to study theoretical and practical the innovative Additive Manufacturing technologies, because the students don't have knowledges about these technologies. The project help them to learn how they can create fast and with great accuracy industrial complex parts. Additive Manufacturing it's a must-have of the education and these technolgy help the students to develop their imagination and innovation in industrial domain.
Additive manufacturing is considered to be the third industrial revolution, due to the manufacturing possibilities, the different materials that can be used and the ease with which parts with complex surfaces that are difficult to achieve with classic technologies can be made.
The AMAZE project and partnership needs are (overall and target groups):
-During the war period, it becomes clear how important is to acquire industrial resources and knowledge (e.g., HEIs) fast and reliable.
-To introduce the novel methods applicable for industrial engineering, design and additive manufacturing domains, that are very important for the students and practitioners in the field of industrial engineering, design/architecture fields.
- To properly acquire required knowledge and to develop and implement new engineering methods and industrial techniques, by connection and collaboration between scientists, engineers, students with the companies.
-To tailor the requirements of the specific student or groups, and based on novel learning methods
-To reduce HEIs costs: less of expensive mobility, easier access to modern technologies, less overall expenditures for university, availability of highly skillset (the best in Europe)
- To upgrade and innovate existing curriculums, and to make a template for future development of contemporary educational material in the field of medical engineering and other fields of science and technology
- To enable development of specific courses required by industry, medical clinics and interested society entities, like National Employment Agencies, trough network cooperation.

What are the target groups of the project?

The main Target groups are: HEIs, Industrial and research engineers, companies.
The students, scientists and professor in the fields of Industrial Engineering, Mechanics, Design/Architecture, computer programming and more are the main target group of the project, because they will be the main actors and the main beneficiaries of the activities and the actual results obtained following the collaboration of the partners in the AMAZE project consortium.
Another target group of the project are Companies interested in the workforce, to have employees with performance and solid knowledge in the field of industrial engineering, in order to align with current European standards and to face the increasingly fierce competition regarding quality industrial products. The industrial companies are another target of the project, because they will effectively participate in the implementation of the project, the Edibon company from Spain is included in the project, which has great experience and carries out activities on all continents, America, Europe, Africa, Asia and Oceania in the field of education and in technologies, giving feedback to the project results. The research institutes in the fields of the project will be interested in the activities and results of the project.
These encompass especially the megatrends of digitalisation in manufacturing companies as well as the social/ethical and climate/environmental sustainability challenges that are central in current and future EU policies. Indeed, recent research and industry practice have highlighted that these trends constantly yield novel applications in the mechanical and manufacturing engineering domain. They simultaneously require careful management of resources, perceptions, and cooperations to enable a successful large-scale implementation to ultimately realize the benefits of smart and sustainable factories of the future.

How did you identify the needs of your partnership and those of your target groups?

Knowing the special situation in Ukraine due to the war that broke out there, higher education being seriously affected, due to students giving up their studies, the restrictions in this country, both political and economic, the needs of this partnership were identified for the improvement of educational, pedagogical and technological activities . in order to be transmitted to the student, for the assimilation and development of technical knowledge in the fields addressed by the AMAZE project.
Also, profile companies in Ukraine and Europe want well-trained graduates in the fields of industrial engineering, design/architecture, additive manufacturing, due to the rapid advancement of new technologies, the ever-lower manufacturing prices used on the market that put pressure on manufacturers, combined with global trends. In the field of industrial engineering/design/architecture, the companies and the research institutes that employ graduates of higher education are the ones target groups who give feedback on the technological educational quality and the specific knowledge of the field assimilated by the students, thus being some of the main beneficiaries of the results of the AMAZE project.
The Quadruple Helix Model of innovation recognizes four major actors in the innovation system: science, policy, industry,

and society. In keeping with this model, more and more governments are prioritizing greater public involvement in innovation processes. In the educational programs in the fields of industrial engineering, design/architecture, the subjects related to the study of the latest generation innovative technologies, of additive manufacturing, shine completely or are in the form of optional disciplines, for this AMAZE project proposes to transmit the necessary skills and knowledge to students in this field.

How will this project address these needs?

The subject of the AMAZE project responds to a particularly current problem, with direct practical relevance, especially regarding the optimization of the use of resources, innovative manufacturing technologies, that will be presented to students and staffs of AMAZE consortium. The FreeForm architectural modules present a wide variety of complex shapes, with low weight and high rigidity, mimics the nature forms. The proposed digital manufacturing technologies, with direct applicability, bring important economic advantages related to the reduction of time, materials and energy. Free-form (FF) surfaces and the unconventional geometric approach, resulting in complex surfaces, represent a current trend in contemporary architecture. The search for intelligent forms, inspired by nature, is of utmost importance, and for this the project realized courses and module courses of the Intellectual Outputs IO1 about: Additve Manufacturing, CAD/CAM/CAE Design, Smart (Intelligent) Materials, Computer Programing, Virtual Reality/Augmented Reality VR/AR, Sensors and Electronics , Reverse Engineering. For the practical deepening of the knowledge acquired within the project, will take place the Intellectual outpouts IO2, which consist in e-toolkit manual for digital learning in producing complex design industrial parts. Through the use of new design/digital design software, such as GD, the realization and production of such surfaces becomes a reality. It is necessary to emphasize that generative design and its procedures are infinitely more efficient and effective than conventional CAD, CAE, CAM methods; In addition, internationally, the idea of incorporating material behavior into generative design is in its infancy. In the intelectual outputs IO3 will be realized AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing In the Intellectual Outputs 4 will be realized AMAZE e-case studies for project-based learning method.

Partnership and cooperation arrangements

Partnership composition

Organisation ID	Legal name	Country	City	Organisation type	Newcomer
E10208641	UNIVERSITATEA POLITEHNICA DIN BUCURESTI	Romania	BUCHAREST	Higher education institution (tertiary level)	No
E10207348	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH	Ukraine	CHERNIVTSI	Higher education institution (tertiary level)	No
E10208306	POLITECHNIKA POZNANSKA	Poland	POZNAN	Higher education institution (tertiary level)	No
E10060431	EDIBON International, S.A.	Spain	Mostoles	Small and medium sized enterprise	No

Cooperation arrangements

How did you form your partnership? How does the mix of participating organisations complement each other and what will be the added value of their collaboration in the framework of the project? If applicable, please list and describe the associated partners involved in the project.

The consortium includes 3 HE institution in the field of industrial engineering, additive manufacturing, design and/or architecture and 1 ICT company from 3 program countries, Romania, Poland, Spain and one of a third country not associated to the Programme, Ukraine. The participating organisations complement each other to improve the educational and technical methods used in industry.
Associated partners will ensure knowledge transfer and that adequate provision of valid requirements is provided.
The partnership combines educational, technical, and service providers which will ensure its implementation, and provide basis for the network establishment.
The project should be carried out transnationally due to: * Promotion and strengthening of international friendship and cooperation in agreement with EU goals and efforts * Choosing the best minds from several countries in their own field and institutions * Sharing the workload with the goal of achieving the product finalization at the earliest possible time * Achieving many different perspectives which should lead to approaching and addressing the project from every possible way, which in turn should lead to best end product * As a bonus, making the product multi-lingual right from the get-go * Consortium is the most appropriate way of achieving different experiences and expertise necessary to produce relevant and high quality project results * Partners were selected based on activities and experience in areas relevant to this project.
Specifically, for this project, partnership will bring following to the realization of project objectives: * Application and dissemination of NEM method in other partner countries and world-wide, trough, to improve educational processes, and to improve learning outcomes. * Application of NEM (Novel Educational Methodology) and STEM (Science, Technology, Engineering, Mathematics) approach in the educational processes in partners countries, and possibly in other interested countries. * Improvement of existing (selected) Curriculums by including each partners expertise. * Creation of specific contemporary and novel courses in the field of medical engineering, by using each partner expertise. * Forming the specific platform for cooperation, good communication, collaboration and knowledge exchange in the field of industrial engineering, because classical online communication platforms does not provide personalized content creation and distribution.

What is the task allocation and how does it reflect the commitment and active contribution of all participating organisations (including the associated partners, if applicable) ?

Tasks and responsibilities within the AMAZE project were discussed and distributed after a thorough analysis that was made in the preamble before writing of the proposal. For each Intellectual output it was allocated one institution as being responsible, which will take the leading role of the tasks, with the main contribution of all other partners of the AMAZE consortium.
Starting from the common curriculum which was constituted in the AMAZE project as it was agreed and established based on the reach experience and expertise of the Poznan University of Technology in the industrial engineering domain, sustaining courses will be prepared in IO1 under the coordinating of the University Politehnica of Bucharest (IO1), leading partner that has also the required experience and expertise in the conceiving and realizing of industrial products that are similar with the ones intended to be developed in the AMAZE project. Yurii Fedkovich Chernivtsi National University (YFCNU) has one key role not only in monitoring and providing feedbacks regarding the support course modules that are being prepared in IO1, but also in leading the IO2 related to the developing of one toolkit manual that provides details about all necessary steps in the conceiving, designing, producing, programming and testing of the new industrial products that will be developed in the AMAZE project. IO3 will be led by EDIBON company, since they have the highest experience and expertise in programming and interconnecting the new developed industrial parts with VR / AR / mixed reality applications. EDIBON company has great expertise in teaching equipment for engineering and in 14 technical education areas, collaborating with prestigious universities of world. Actually the EDIBON partner will have a key role in providing the necessary feedbacks related to the testing of the new industrial parts with complex design, manufactured by Additive technologies that will be conceived at the level of the AMAZE consortium. For selecting the right materials, for designing the parts that are needed, for validating the solutions by finite element analysis and for producing the parts by Additive Manufacturing methods these aspects will be made jointly at the University Politehnica of Bucharest (UPB), in cooperation with Yurii Fedkovich Chernivtsi National University (YFCNU) and Poznan University of Technology (PUT). Actually from the risks point of view, this is one strong point that the AMAZE consortium have, since for example, in terms of Additive Manufacturing and CAD, CAM solutions, all partners have 3D printers and specialists in these domains. In terms of VR/AR, EDIBON has also expertise complementary to UPB, since they were involved in similar projects related to the developing of industrial engineering. Poznan University of Technology (PUT) has been assigned as leading partner of IO4, having experience in publishing and disseminating of the results, organizing annually MANUFACTURING Conference.

Describe the mechanism for coordination and communication between the participating organisations (including the associated partners, if applicable)

A communication and dissemination plan which will be elaborated on the occasion of the project kick-off meeting (which will be held in Bucharest, Romania) will provide the necessary information to the partners regarding the internal and external communication. In addition, part of the overall dissemination and communication strategy will be built in synergy with the partners of AMAZE consortium. During the TPM (Transnational Project Meetings), coordinate by the project promoter and

by the partner responsible for each IO that will take place within the project, the progress of the activities carried out regarding Intellectual Outputs (IO1, IO2, IO3 and IO4) will be monitored.
The aims of these meetings:
• to produce synergy for outcomes that are only possible by working with others;
• people get to know each other better and this is the basis for the long cooperation and personal contacts between people;
• project meetings are perfect for discussions and evaluation work;
• visiting enterprises in other countries, comparing with own country;
• preparing teaching materials/worksheets collaboratively.
The multiplier events ME of AMAZE project will be organised with the purpose of disseminating the Project Results produced by the project. The costs incurred by an organisation participating in such multiplier events can be financially supported. Support for Multiplier Events is provided only if they stand in direct relation to the Project Results of the project.
The AMAZE e-learning platform will present the most important features of the project together with the latest events, news and project meetings. The coordinator UPB will host the platform and keep it updated. Piloting and evaluating of the effectiveness of AR / VR / mixed reality interactive technologies (linked to IO3), training platform, will be piloted as well by the company EDIBON. The main dissemination language will be English, although several other languages (Romanian, Polish, Spanish and Ukrainian) will be used during the dissemination stages, but this depends on the audience.
Online channels: - Submission of public versions of reports at each reviewing stage to consortium partners through the AMAZE project Website - Posting of project reports, news, feedback and comment on the AMAZE project's Website - Social Network Site (SNS) profile for the AMAZE project on high membership European SNS (such as Facebook, Linkedin), with project blog and membership within the network of main green interest groups.
The dissemination task will run throughout the project cycles identifying the methods and content for dissemination. Responsibility for the detail of dissemination will reside with the partner responsible for the original content. Monitoring meetings will be held by ZOOM monthly by the Intellectual Output responsible /leader to monitor the progress of the activities and to take the required measures if it will be the case.

Describe the extent to which the involvement of a participating organisation from a third country not associated to the Programme brings an essential added value to the project (if this condition is not fulfilled, the participating organisation from a third country not associated to the Programme will be excluded from the project proposal at assessment stage).

In the AMAZE project is involved of a participating organisation from a third country not associated to the Programme, the Yurii Fedkovich Chernivtsi National University from Ukraine, that brings an essential added value to the project, grace of materials expertise, design and Additive Manufacturing experience. The Yurii Fedkovich Chernivtsi National University from Ukraine has a great research potential, grace of the 2 educational and scientific institutes.
Taking into account the situation in Ukraine during the war, in which university education suffers from the lack of material possibilities, the decrease in the number of students, and for that AMAZE project wants to be an incentive for the improvement and innovation in the field of design, of the new additive manufacturing technologies used in industrial engineering within the university education system in this country.
The Yurii Fedkovich Chernivtsi National University from Ukraine is a prestigious university with recognized specialists in the fields of composite materials, material analysis (eg SEM, XRD analysis), design, additive manufacturing, thin films, theoretical and experimental studies of X-ray scattering by complex crystalline compounds; development of theoretical foundations of multilevel processing of experimental X-ray and electronic signals using genetic algorithms and artificial neural networks; creation of new original non-destructive methods of quantitative assessment of structural heterogeneity of multi-component crystalline compounds, thin films, highly dispersed materials, ultra-strong concrete composites, as well as methods of express control by physico-chemical nanoprocesses of structural phase changes, built on the basis of X-ray diffractometry, electron-raster and atomic and magnetic force microscopy, having scientific research in the study of the structure, physical and chemical processes of the formation of ultra-high strength concrete composites.
The Yurii Fedkovich Chernivtsi National University from Ukraine will be the leader of IO2 (AMAZE e-toolkit manual for digital learning in producing complex design industrial parts), this university having numerous technical laboratory and being dotted with Additive Manufacturing systems. For IO2,IO3,IO4, the Ucrainian university realize solutions related to the materials to be used for the realizing of new developed complex design industrial parts, due their expertise.
Concerning IO1, will realize the chapters concerning Smart (Intelligent) Materials and CAD/CAM/CAE design, having international recognized specialists in these domains, that are articles published in these fields, in Nature and ISI journals with higher impact factor. This prestigious university from Ukraine has scientific, educational expertise (professors, researchers), digital and technical skills, laboratories and equipment's which cannot be found in any of the partner countries of the ERASMUS+ program, adding an inestimable value to the AMAZE project.

Impact

How are you going to assess if the project objectives have been achieved?

One of the most important impact foreseen is related to the professors which are involved in the AMAZE consortium and which will be working / preparing the AMAZE resources, either we are referring to the e-course modules, e-toolkit manual, e-learning platform or e-case studies defined and developed on the level of the AMAZE consortium.
By gaining this experience they will share the theoretical knowledge and they will innovate the curriculum in the context of new Additive Manufacturing technologies for developing and realizing of different industrial parts with complex design.
Adopting of new methods of teaching (developing and using of VR / AR / mixed reality applications) will enhance the teaching and learning processes at the end of the AMAZE project by delivering higher qualitative courses for the students that are coming from the AMAZE consortium universities partners.
Engaging of students in the real case studies and in topics of research in the field of industrial parts with complex design / Additive Manufacturing domain will provide to the students the opportunity to gain practical knowledge of the integration of different engineering domains for solving different issues on a very practical level. AMAZE consortium aims to find different tools and methods in motivating students to be actively involved in the teaching process, by developing and using of different modern methods such as VR /AR / mixed reality in programming and testing of new industrial parts with complex design developed within the AMAZE consortium.
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached: - activities implemented according to the project's timelines: >95% - an accomplishment of the project objectives: >95% - objectives of each transnational meetings have been clear to participants: >80% - satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80% - quality of the intellectual outputs prepared by all partners: >95% - learning objectives for the international training sessions have been met: >85% - satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80% - satisfaction of participant in the training (summer school) activities : >80% - overall project quality assessment (made by partners): >80% - satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials) > 80%. At the European and International level it will be possible to monitor the development of the international applications and citing/references of the scientific publications that will be made at the AMAZE consortium level.

Explain how you will ensure the sustainability of the project: How will the participation in this project contribute to the development of the involved organisations in the long-term? Do you plan to continue using the project results or implement some of the activities after the project's end?

The sustainability of the AMAZE project will be on the long term, grace of the different European higher education institution, industrial companies involved in project, due to the dissemination project results. Most of the case studies launched on the level of the e-learning platform of AMAZE project will be defined in cooperation and based on the input provided by the major stakeholders that are activating in the field of Design, Industrial / Additive Manufacturing technologies.
Sources and resources provided for students aims to reduce the drop-out rate of the students during the war and politic and economic instability period.
All teaching methods and resources realized within the AMAZE consortium (e-book, e-toolkit manual, e-learning platform), research activities in developing new industrial parts with complex design and ideas shared through the AMAZE e-learning platform will be used for attracting the main stakeholders which are activating in the Additive Manufacturing / Mechanics / Design domains, all these stakeholders being encouraged through the organized events to join the AMAZE e-learning platform in order to realize finally one European Network for Additive Manufacturing in Industrial Design for Ukrainian Context formed by major EU institutions that are coming from the Higher education domain, SMEs, IT sector, etc. which are interested in using the resources of the AMAZE project (which will be shared on open access level) and could be actively involved further on in building of strategic partnerships for applying for different research or institutional EU projects. Better education, student impact and competence development, motivation at local level, as well as higher attractiveness for potential (graduate) students at Regional and National level are impact that are foreseen to be reached on the AMAZE consortium level. On the long term, increasing of the reputation in the university community and in company networks, as well as providing of higher attractiveness for potential (graduate) students, reputation among partner universities, reputation by significant publications are important KPIs that are expected to be reached in order to increase the visibility and impact of the AMAZE consortium at the International level. Exchange of experience between universities, business sector and representatives from the human resources field developing a common tool and methodology have a positive impact on the quality of the projects implemented by partner organizations. During the project implementation, students are also expected to be impacted by the project results. The students will be informed by the AMAZE website and also during the multipliers event they will be part of. They will be more aware about the companies expectations and the Universities curriculum and modern teaching methods that are aimed to be implemented in the future in the context of digitalization.

Please describe the potential wider impact of your project: Will the impact be equally spread among the involved organisations? What is the potential impact of the project on each participating organisation as a whole? Are there other groups or organisations at local, regional, national or European level that will benefit from your project? Please explain how.

The impact will be equally spread among the involved organisations, because all entities involved in the AMAZE project will

make efforts to achieve the project results.
During monitoring activities in AMAZE project, special focus will be: • for assessment of the work process: the goal of assessment is to provide: (a) a clear conceptualization of process outcomes, (b) a description of how these outcomes are assessed and measured, (c) a description of the results obtained from these measures, and (d) a description of how these results validate current practices or point to changes needed to improve the work process. • for assessment the partner meetings: it will be assessed the organization and outcomes of the AMAZE partner meetings. • for monitoring the project outcomes: to each deliverable will be established a deadline, a responsible partner and the degree of the fulfillment. The list will be permanently up-dated to illustrate the state-of-the work and form a basis for the discussions at partner meetings and Skype / ZOOM meetings. Can be considered done only the IOs having achieved a 100% fulfillment. On each university involved in the AMAZE consortium, evaluation of Semester results, student Evaluation of Teaching are methods of evaluating the impact of AMAZE project on the local level. Questionnaires that will be requested to be fulfilled by the attending students at the AMAZE International summer schools which will provide feedback on the content of the e-courses, e-toolkit manual, as well as about their experience in using the e-learning platform in correlation with teaching process (easiness, clearness, coherence & interconnection between information provided by the teachers that are using the platform during their courses / different modules that are being followed are key indicators which will provide important feedbacks related to the quality and issues that still need to be improved on the teaching resources offered on the e-learning platform of AMAZE consortium.
There is also one important indicator on the e-learning platform of AMAZE project which can be taken into consideration for measuring the impact, such as the number of downloads of the e-courses / e-toolkit manual, number of people that have accessed the e-learning platform. Also the number of registered individuals that have been accessing the platform in order to register for the organized events will be one significant indicator.
Communication team will be able to collect all these data. For the registration via the platform, some data will be required, such as the profile, it is important to know if the person who is accessing the platform is coming from the Higher education system & its profile (if he is a teacher, student, scientist), as well as if it coming from the industrial sector / SMEs / etc. for building of the European Network for Additive Manufacturing in Industrial Design for Ukrainian Context at the end.

Please describe your plans for sharing and promoting the project results: How do you intend to make the results of your project known within your partnership, in your local communities and in the wider public? Who are the main target groups you intend to share your results with?

To maximize the impact of the reached results, the AMAZE partners will invest appropriate effort into dissemination, exploitation and communication as declared in the IO4. Conceiving, designing, realizing, programming and testing of new industrial parts with complex design on the research level will constitute the premises for realizing of different BSc / MSc / PhD thesis in mentorate / co-mentorate basis at the level of the AMAZE consortium. The goal of the dissemination is to provide a practice-proven experience guide to Additive Manufacturing of industrial complex parts learning. Target groups are teaching staff in engineering disciplines in general and Additive Manufacturing in particular. This accounts both for inside and outside the universities that are part of the AMAZE consortium: colleagues within departments/faculties / universities of the AMAZE consortium (dissemination can be done in written form; by oral presentations; personal guidance, etc.) on the local level. Exchange of knowledge can be made with partner that are coming from other universities at Regional and National level, as well as the international scientific community that is activating in the industrial/ design / Additive Manufacturing domain by sharing the open source documents, scientific articles and friendly cooperation/support).
Number of teaching staff and students, companies involved in Learning Teaching & Training / Multiplier events / International Summer school activities events is another quantified indicator for plans for sharing and promoting the project results. There is one system at regional and national level (at least in Romania) through which the zip-codes of study applicants and link the mean distance to overall attractiveness and visibility of study Programmes are being monitored; as well as potential databases of stakeholders that are able to bring important contribution and are interested about the topic of the AMAZE project (industrial/ design / Additive Manufacturing domains). Identifying of colleagues in partner institutions who will acts as observers to help the AMAZE consortium in assessing the implementation of the AMAZE project is aimed to be performed by each member that is coming from the Higher Education domain. The Multiplication Events will be held at different partners from the AMAZE consortium, in which professors, students, engineers, researchers from different universities, companies interested in the field of the project will be invited. The Multiplier Events will be announce on different modes: on the project site; on the institutions site; facebook, media, flyers, etc.

Workpackage activities

In addition, subcontracting of services is allowed as long as it does not cover core activities on which the achievement of the objectives of the action directly depends. In such cases, the amount budgeted for subcontracting must be included in the description of the activities covered by the subcontract.

Work package n°1 Project Management

How will the progress, quality and achievement of project activities be monitored? Please give information about the involved staff, as well as the timing and frequency of the monitoring activities.

As soon as the Romanian National Agency approves the proposal for funding the project coordinator and the partners will organize an online Skype (Zoom) meeting where the preliminary preparatory steps will be concluded. This will include: - Establishment of partners' bilateral agreements; - Procedures for the delivery of the first financial installments of the budgets; - Negotiation on possible date for the kick-off meeting in Bucharest, Romania; - Agreement on final version of GANTT chart of activities per month - Establishment of rules for project, financial expenditures and dissemination monitoring of realized activities; - Discussion and agreement on the project brand like project logo, website URL etc.; - Extending the stakeholders identification document and its regular update; - Planning of first mass media campaign in each partner country to announce the project start and expected outcomes; - Establishment of internal file storage system (Dropbox, Google Drive, One Drive); - Setting up of mailing list (Google Groups). - Connection to the APs included in the project, and establishment of protocols for sustainable cooperation. - General project management structure support activities will be performed and following will be preliminary (not conclusively) defined: * Project Steering Committee (PSC) - Project management activities on the top level - transnational. Internal project team * National Advisory Board (NAB) - Overall monitoring of the project implementation - national - External team from each partners country, with one member from project team * Monitoring and Evaluation Committee (MEC)- Direct tracking and monitoring of the project implementation, i.e. qualitative and quantitative indicators - national - Internal project team. For each workpackage, regarding the monitoring, development and achievement of the results proposed in the project, each partner of the AMAZE project consortium will be leader, such as Workpackage 2, the leader will be the Polytechnic University of Bucharest, it will keep in touch with all partners, there will also be the Conference launch of the AMAZE project that will be carried out in Bucharest and will be hosted by the UPB.
Workpackage 3 will be handled by the partner from Ukraine, The Yurii Fedkovich Chernivtsi National University, which will monitor the activities necessary to develop the toolkit, contributing each partner of the AMAZE project consortium.
Regarding Workpackage 4, the partner from Spain, the company EDIBON, which has expertise in the field of Computer Programming, Virtual Reality/Augmented Reality VR/AR and in digital skills, will monitor the performance of the virtual laboratory, in which all partners involving in the project will participate, namely realize IO3 - AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing (the virtual realization on the website of a 3D laboratory). For workpackage 1, all partners monitoring their activities.

How will you ensure proper budget control and time management in your project?

Funds for "Project Management and Implementation" are provided to all Cooperation Partnerships based on the number of participating organisations and the duration of the project. The purpose of these funds is to cover diverse expenses that any project may incur, such as planning, communication between partners, small-scale project materials, virtual cooperation, local project activities, promotion, sharing of project results and other similar activities not covered by other types of funding. A partnership may receive a maximum of 2750 EUR of "Project Management and Implementation" grant per month.
In AMAZE project, the Coordinator for Project Management and Implamantation budget has 9750 euro and per month has approx. 813 euro. The partners of AMAZE consortium have 14228 euro, and for month will have approx. 396 euro. In this case, the budget of PMI per month will be 1209, and we don’t exceed the maximum admis of 2750 euro.
The grant for PMI will be used for: - Administrative and financial management - during the project lifetime under this item the administrative manager in each partner organization will be covered. - Accurate financial monitoring – on a three-months bases each partner should provide reports including relevant supporting documents - timesheets, payrolls, pay slips, documents for payment to the staff, invoices etc. - Payment of the accountant services - partners will use part of the cost to pay for accounting of project activities only for this project. - Production of project dissemination website and its maintenance – for which Coordinator and P3 are responsible. - Production of press releases - every six months P1 and P2 will produce and all partners will translate and disseminate to their list of stakeholders (see Dissemination section of the proposal) - Organization of meetings with all associate partners and members of boards. - Other valid implementation expenses. - Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far. - The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided. - The proper time management will be also monitored by the internal quality manager P2 which will provide observations during Progress and Final stage of the project duration. * Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule “money for value” by all partners. * The project partners have extensive networks consisting of project stakeholders and their commitment to use them for the project’s purposes is evident.

What are your plans for handling risks for project implementation (e.g. delays, budget, conflicts, etc.)?

* The PSC and NAB are directly responsible for the management and budget control of the project. All project activities, monitor and control, and outputs are carefully chosen and defined, in order to enable successful implementation of the project.
* The MEC board will monitor results through indicators, and report to NAB. If there is a need NAB will inform top-level management (Steering committee), about possible issues which need to be resolved on high level. Low level (national and transnational) issues will be resolved by NAB.
Overall monitoring timing for activities and budget:
- Each month indicators monitoring - MEC
- Each two months monitoring of activities and budget - NAB
- Each 6 months top-level control - PSC
Internal forms for reports will be defined in order to eliminate differences and to make faster reporting and possible corrective actions. In terms of proper budget control, the Project Coordinator (P1) took the following preliminary actions:
- The budget was estimated based on the partners roles and responsibilities for each intellectual output and activities that needs to be covered under PMI and exceptional costs.
- The numbers of the days and costs are based on real costs of planned activities, internal rules of each partner organization with regards to the staff salary estimation and with reflection of rules by the general guide of Erasmus+ Programme 2023.
- The budget is very compact and includes only scheduled tasks described in the application
- The resources allocated are guaranteed by the involvement of well-qualified and experienced staff in project realization that will promise the European standard of final outcomes
See partners profiles and key staff involved at partners' profile sections above.
- The financial instalments will be delivered based on the achieved results by each partner listed as Annex to the partners' agreements.

How will you ensure that the activities are designed in an accessible and inclusive way?

- Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far. - The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided. - The proper time management will be also monitored by the internal quality manager P2 which will provide observations during Progress and Final stage of the project duration. * Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule “money for value” by all partners. * The project partners have extensive networks consisting of project stakeholders and their commitment to use them for the project’s purposes is evident. This, together with the project’s structure of core partners, ensures that money spent on promotional and other networking activity will produce an excellent rate of return. Basically, the partnership will ensure effective co-operation and communication through the following APPROACHES: a) FACE TO FACE meetings: - During the whole project duration, the partnership will meet three + four (online) during the transnational partners' meeting. To ensure an effective and efficient meeting, every meeting will have a clear agenda which will be circulated a month before the actual meeting is held. - A moderator (from the applicant institution) will conduct the process of cooperation. - Another administrative person from P5 (P1 as replacement) will record all discussions and will produce the protocol instantly after the meeting end for agreement and comments by the partner organizations. It will contain all the arrangements, tasks and responsibilities agreed during the project meeting. - It is expected that each partner will come with at least two representatives - one responsible for the project management and the other one - for the development of the intellectual outputs. - Apart of each meeting a workshop with representatives of local target groups, stakeholders and gatekeepers is expected to be organized. This will ensure that the project is producing valuable products for the aforementioned target groups which will be involved in all steps of their development by provision of thorough feedback. b) ELECTRONIC communication: Between the project face to face meetings, the communication and co-operation will be managed by using electronic communication tools (email mailing list). c) SKYPE (VIBER, ZOOM) conferences: Monthly Skype conferences will be held and moderated by the coordinating organization. During those meeting a thorough review of the progress towards the action plan and the GANTT chart will be conducted. d) INTRANET file storage (Dropbox, Drive, One Drive): This will allow the partnership to have access to the

How does the project incorporate the use of digital tools and learning methods to complement the physical activities and to improve cooperation between partner organisations?

The AMAZE project has very important intellectual outputs strongly correlated to the chosen priorities: a) In-house developed Novel educational Methodology (NEM) which can be described as innovative method which provides digital "molecules"of knowledge, with learning atoms (basic elements of theoretical or practical knowledge) created from STEAM and associated fields specific educational material. By combining units, one can create personalized learning outputs, and to acquire macro and micro-credentials. b) E-platform which will enable forming of knowledge triangle network in digital world, and in that way enable cooperation, collaboration and knowledge transfer and assessment, and provide support for NEM application. c) Courses created by using NEM, and STEAM philosophy.
The AMAZE project incorporate the use of digital tools and learning methods to complement the physical activities and to improve cooperation between partner organizations, teaching process and the accumulation of technical and digital knowledge by students, teachers, researchers and companies. As part of the AMAZE project, an online site will be created

on which all course modules (IO1) will be submitted, as well as the created toolkit (IO2), a virtual laboratory (IO3) with all partners participation will also be created, where students will learn to navigate and study different additive manufacturing processes, industrial processes and manufacturing systems, as well as all project results will be disseminated on this platform. People interested in the activities and results of the AMAZE project will be able to register on the project website in order to effectively participate in the activities, the Module Courses (IO1), Toolkit (IO2), the AR/VR platform of the virtual laboratory (IO3), studying the proposed e-cases (IO4) establish by the partners of the AMAZE consortium, as well as the results of the project, the feedbacks given by students, by companies, research institutes, respectively by other universities given to this project.
The EDIBON company has participated successfully in a number of education related projects), in all world, in America, Europe, Asia, Africa, Oceania, which will use its digital and technical expertise in the field of education and engineering to pass it on to all the partners of the consortium. The AMAZE project incorporates the use of digital tools and learning methods to complement the physical activities and to improve cooperation between partner organisations because all student's participant into AMAZE project will learn the theoretical informations using the module courses, using digital skills and realizing physical activities in the laboratory to design and to manufactures the industrial complex parts usind the new Additive Manufacturing Technologies.

How does the project incorporate green practices in different project phases?

The growing demands to manufacture industrial products quickly, with high precision and cheaper, have made the AMAZE project involve green project management practices. The AMAZE project consortium includes green practices in different projects phases, because the additive manufacturing technologies that process by depositing layer by layer used material as much as is necessary and where it is necessary, without any loss of material, manufacturing parts with complex shapes and the complexity of the shape, not influence cost of industrial products. Also, Additive Manufacturing uses versatile ecological and non-toxic materials for the environment, which can be recycled. Additive manufacturing technologies are state-of-the-art technologies that meet and comply with all standards regarding green practices.
Various research projects indicate that between 80% and 90% of the economic and environmental costs of a product are established in the initial design stages. It mentions three typical aspects for optimizing the ecological design process of a product: a) introducing environmental aspects into the product design and development process from the beginning; b) life cycle focus; and c) multi-criteria focus, considering that environmental and traditional criteria must be considered simultaneously. However, in practice, there are few green design tools for products in the initial stages of the design process, especially if they concern complex products. The AMAZE project proposes in IO1, to present a course module on Additive Manufacturing and CAD/CAM/CAE software, in which ecological practices and the need to use eco-design in industry will be presented. In the last decades Additive Manufacturing (AM), also known as 3D printing, has emerged as a technology which disrupts productive systems, forcing managers to reconceive them. In fact, AM was considered as potentially one of the most disruptive technologies, which could lead to the fifth industrial revolution by 2025. Initially, it was used merely for prototyping purposes, but nowadays AM is used also for the production of end-use products. In fact, the improvements in terms of quality, price and processing times make the AM market a fast-growing track in recent years, with the potential to affect not only the whole industry, but also other domains.
Academic literature on AM spans a wide range of issues across different levels of analysis. Most studies concern the potential disrupting impacts that AM has on the economy, society and the environment.
As a disruptive digital technology, adopting additive manufacturing impacts the state and structural dynamics of supply chains, thus affecting their resilience, which is essential for business continuity and dealing with unforeseen events such as the COVID-19 pandemic and can be used
Notwithstanding, the adoption of AM across firms is still limited and some challenges restrain its wider adoption in the industry.

How does the project encourage participation and civic engagement in different project phases?

The project will meet the stated need by: a) Improving the educational processes for students and industry engineers, by improving/updating and applying novel learning methods, such are NEM (Novel Educational Methodology – P1 in-house initially developed) and STEM (Science, Technology, Engineering, Mathematics). * Implementation of novel learning and teaching methodologies and pedagogical approaches, aiming at effectiveness, efficiency, trainee and teacher morale, gaining and improving complex medical and engineering knowledge and skills, based on innovative ICT technologies, are essential for the suspenseful implementation of medical engineering studies and research. b) Establishing a knowledge triangle network (IO1, IO2 and IO3), which will provide just-in-time response to industrial engineering, additive manufacturing and design demands through an open web platform, using different industrial e-cases practically studying established by partners (IO4), and define protocols for knowledge exchange and cooperation, which is very important for each partner in the consortium and for companies, researchers and students, professors, that are encourage participation on all project phases, grace of the transparency of this educational support realized by AMAZE consortium. c) Creating an E-platform (AMAZE – IO3) which will enable: * eLearning based on novel educational methodologies (NEM and STEM) * Collaboration and knowledge exchange which will enable to scientists, engineers and students knowledge exchange, thus, make it easier to develop and implement new engineering methods and medical techniques. * Open access and therefore, public engagement will be achievable, and desirable. * Toolkit for improving learning capabilities of students for each European country. * Significantly costs reduce, because it does not require its' users to travel in order to participate in lectures (access over web), gives access to modern learning with no charge to user, etc. d) Developing an Innovative HEIs

Curriculums with learning material created by using NEM and STEM (IO1) e) Developing pilot courses, with potential for application in HEIs, industry, design and architecture practice (IO2)

Grant amount allocated to Project management
23 978,00 €

Work package

Work package n°2 - IO1 - AMAZE e-book for developing of complex design industrial parts

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

The manufacturing of “complex geometries” refers to parts with three-dimensional designs with features such as undercuts, hollow spaces, or intricate internal structures. However, additive manufacturing processes are proving to be far more effective means by which to create geometrically complex parts. This is because additive manufacturing methods create pieces by adding material one layer at a time, enabling engineers and designers to produce parts with involved geometries —even those with open interior spaces —as a single piece.
The specific objectives of this work package and how do they contribute to the general objectives of the project consist in realization of IO1 – AMAZE e-book for developing of complex design industrial parts, comprising the next module courses: 1-Additive Manufacturing (UPB);2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UPB);7-Virtual Reality/Augmented Reality (Edibon). Courses will be prepared by the experts of the AMAZE consortium and students which will be selected to follow this curriculum will be selected so as they will be constituted on the inter-complementary and transnational bases.
The leader of this work package will be the Polytechnic University of Bucharest, which will monitor the progress of the activities and results obtained within this work package (WP2), as well as the launch conference of the AMAZE project, which will be hosted by UPB. As part of this workpackage, there will be a project multiplication event that will take place in Madrid, Spain, hosted by the Edibon company, with 40 people from outside the company, from other companies, universities, research centers, etc. interested in the field of the AMAZE project, respectively 8 foreigners who are not involved in the project, but who are interested in the activities and results of the AMAZE project, will participate, growing project dissemination.

What will be the main results of this work package?

The main results of this work package consist in:
-e-book elaboration using new learning methods, for help the students to quick understanding, being clear theoretical concepts through practice, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform, using digital skills. The AMAZE e-book for developing of complex design industrial parts, will comprise the next module courses that will be charge on the AMAZE project site for responde for all students demand and for all stakeholders interested by the project domains: 1-Additive Manufacturing (UPB); 2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UPB); 7-Virtual Reality/Augmented Reality (Edibon).
-The Multiplier Event ME1 (1day) realized at Edibon company P4, having invitated 40 persons from different companies, universities, research centers and 8 foreigner persons that will participate, will permit to a greater visibility of AMAZE project activities and results.
All teaching methods and resources realized within the AMAZE consortium (e-book, e-toolkit manual, e-learning platform), research activities in developing new complex industrial parts and ideas shared through the AMAZE e-learning platform will be used for attracting the main stakeholders which are activating in the industrial engineering/design/ additive manufacturing / architecture domains, all these stakeholders being encouraged through the organized events to join the AMAZE e-learning platform in order to realize finally one European Network for Additive Manufacturing in Industrial Design for Ukrainian Context formed by major EU institutions that are coming from the Higher education domain, SMEs, IT sector, etc. which are interested in using the resources of the AMAZE project. Articles published.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

Quantity indicators KPI1. Number of participants (students, engineers, researchers, professors) participated at Multiplier Event ME1, realized at Edibon company KPI2. Number of participants at Transnational Project TPM1, sustained at University Politehnica of Bucharest, Romania.
Methods - filling out attendance sheets.
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website

Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%
- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected

schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials) > 80%.

Please describe the tasks and responsibilities of each partner organisation in the work package.

Tasks and responsibilities of each partner organisation in work package WP2 - IO1 - AMAZE e-book for developing of complex design industrial parts
-Completion of bilateral agreements - led by Project coordinator P1 + all partners
-Creation and implementation of financial monitoring - every 6 months - led by Project coordinator + all partners
-Production of minutes (protocols) during each TPM meeting together with an action plan for the next development and implementation activities - led by Project coordinator + all partners
- Involvement and meetings of National advisory board members - At national level, one national advisory board will be established per country. This national advisory board will consist of local project partners, associated partners, IT companies, policy makers and other relevant stakeholders. Their involvement will ensure that a user centred design approach is applied, while also maximizing dissemination and exploitation of results - led by P1 for ROM, P2 for UKR, P3 for POL and P4 for Spain and PC on EU level
-The exploitation strategy will be elaborated by all partners. It will define the strategy and channels for promotion and mainstreaming of project results, including the identification of key exploitation targets, stakeholders mapping and mainstreaming of final products. The exploitation activities will also target a potential future accreditation of the curriculum and job profile so contribution by all partners is planned.
-Involvement and meetings of Project Steering Committee (PSC).
- Involvement and meetings of Monitoring and Evaluation Committee (MEC)
-Dissemination strategy and stakeholders' involvement throughout the project lifetime - by P2 and P4 including all promotional channels and including detailed stakeholders' identification - contribution by all partners
-Reporting to the National agency P1
- Quality assurance & internal evaluation strategy and implementation P3
-Development of IO1 ebook - all partners

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

In terms of proper budget control, the Project Coordinator (P1) took the following preliminary actions:
- The budget was estimated based on the partners roles and responsibilities for each intellectual output and activities that needs to be covered under PMI and exceptional costs.
- The numbers of the days and costs are based on real costs of planned activities, internal rules of each partner organization with regards to the staff salary estimation and with reflection of rules by the general guide of Erasmus+ Programme 2023.
- The budget is very compact and includes only scheduled tasks described in the application
- The resources allocated are guaranteed by the involvement of well-qualified and experienced staff in project realization that will promise the European standard of final outcomes
See partners profiles and key staff involved at partners' profile sections above.
- The financial instalments will be delivered based on the achieved results by each partner listed as Annex to the partners' agreements.
- Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far.
- The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided.
- The proper time management will be also monitored by the internal quality manager P2 which will provide observations during Progress and Final stage of the project duration.
* Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule "money for value" by all partners.
For IO1: UPB – 2590 euro (days 35, grant per day 74); YFCNU – 1850 euro (days 25, grant per day 74); PUT – 2220 euro (days 30, grant per day 74); Edibon – 4100 euro (days 25, grant per day 25)
TOTAL IO1=10760 euro
ME1 (Edibon) – 40 (participants from Spain=100 euro) + 8 foreigners participants (=200euro) = 5600 euro
TPM1 (UPB) – Bucharest, Romania
Staff:
PUT – 2 professors * 3 days; Individual Support=636; Travel=550; TOTAL 1186 (D3)
YFCNU – 2 professors * 3 days; Individual Support=636; Travel=550; TOTAL 1186 (D3)
Edibon - 2 participants * 3 days; Individual Support=636; Travel=1060; TOTAL 1696 (D5)
The Erasmus+ information tables were used for the calculation of Travel according to distance and Individual Supports, Intellectual Outputs (number of days), etc.

Activities (2 - IO1 - AMAZE e-book for developing of complex design industrial parts)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
IO1 - AMAZE e-book for developing of complex design industrial parts	Romania	15/09/2023	14/01/2024	Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO)	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA) , EDIBON International, S.A. (E10060431 - ES) , POLITECHNIKA POZNANSKA (E10208306 - PL)	20 428,00	The AMAZE e-book for developing of complex design industrial parts, will comprise 7 module courses write by all participants. Multiplier Event ME1 hosted by Edibon from Spain, articles published in Conferences/Journals with higher visiblity.
						20 428,00	

Description of the activities

Describe the content of the proposed activities.

At University Politehnica of Bucharest from Romania will host the launch conference of the AMAZE project, TPM1 (3 days), where the managers, project responsibles and professors, the key persons from each institution participating in the AMAZE project, will meet, with 2 persons by each institutions (so a total of 8 people), of course other teachers interested in the field of the project from the host institution and beyond will also join.
During the AMAZE project, in Work package WP2, will take place the ME1 (1day) from the Edibon company, Madrid, Spain, where will present the objectives, activities and results of the AMAZE project consortium, being invited 40 people from outside the company and 8 foreigners, which will take place between 15.09.2023-14.01.2024.
A very important activity will consist in the realization of the course modules proposed within IO1 (Intellectual Outputs) within the AMAZE consortium, by each institution in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.01.2024 .
In each month will have Online meetings on ZOOM to - Initially start the development of the IOs according to the defined timetable,- Preliminary Negotiations, -monitoring activities of AMAZE project, - Detecting initial problems in project timeline - Input from all partners about created teams, and board and committees - Sharing expertise and discussions - Defining next steps for development of IOs.
TPM1 - First transnational project meeting - Month 3, Bucharest, Romania:
- 2 representatives from each HE partners
- 2 representatives from company
- Detecting problems in project timeline
- Tracking the development of the IOs according to the defined timetable
- Negotiations about input to be provided by each partner
- planning of next steps for development of IOs
- sharing expertise and discussions
- strengthening the partnership by getting to know each other better
- Planning the short-time training C1

Explain how this activity is going to help reach the WP objectives.

Based on the positive experience proved by the use of the curriculum on very practical basis, all these gives students the possibility to gain not only knowledge, but skills and experience in being engaged in the development of new types of industrial parts with complex geometry by Additive Manufacturing methods, this being one of the expected result and tool in implementing and multiplying of the curriculum on a larger scale bases, in different other institutions that are interested in searching ways to provide knowledge, logistic, infrastructure and right support for offering the right skills to the students that are eager to bring contribution at very practical level in accordance with industrial complex products requirements.
The curriculum of ebook of AMAZE project is very adequate to project domain, comprising the next module courses: 1-Additive Manufacturing (UPB); 2-Smart (Intelligent) Materials (YFCNU+PUT); 3-CAD/CAM/CAE design (YFCNU); 4-Reverse Engineering (PUT); 5-Computer Programming (Edibon); 6-Sensors and Electronics (UPB); 7-Virtual Reality/Augmented Reality (Edibon). For prepare Mutiplier Event, respectively Transnational project Meeting the host institution must to send invitations, to send announcements in newspapers, on the websites of partner institutions within the AMAZE project, on the AMAZE project website, to disseminate information related to the Multiplication Event/TPM of the project, to draw up the agenda for ME with the topics that will be discussed, to make flyers, folders, roll-up with the event, minutes and report of event, to purchase catering and coffee break services, to make attendance lists at the ME/TPM and feedback of the ME/TPM. Accounting operations will be carried out regarding the payment of salaries for PMI and professors/engineers/reserachers involved in IOs. Timesheets will be completed. Creation of the AMAZE project website and updating of information and news.

Describe the expected results of the activities.

Based on the curriculum built by the AMAZE consortium, support modules of the courses IO1 that are related to the field of of new industrial parts with complex design by Additive Manufacturing technologies are foreseen to be provided via the AMAZE platform that will be commonly used for teaching purposes by professors of the AMAZE consortium, but also outside the consortium (the set of module courses will be offered on the AMAZE platform with open access).
The AMAZE consortium has the experience & skills for preparing the new proposed curriculum and the required courses as support for the professors & students that will be engaged via the e-learning platform to work on their diploma projects related to the conceiving and realizing of of new industrial parts with complex design (in research direction).
Potential research teams will be launched and announced constantly via the AMAZE platform, so as the students will be able by following the curriculum and getting the right knowledge and skills to sort out the issues of the final reports of the research for their diploma project or PhD thesis, with the support of the AMAZE professors which will be involved as mentors / co-mentors in the conceiving, designing, manufacturing, programming & testing of new industrial parts with complex design to be made by innovative Additive Manufacturing methods.
Transferability of the knowledge to potential stakeholders, that will join the AMAZE platform during the events & activities organized in the AMAZE project is also highly foreseen to be reached by the AMAZE consortium at the end, since writing of

new projects for following up (EEA, Horizon, etc) in the field of AMAZE project or complementary topics is of high interest. The ME1 multiplication event from the Edibon company that participates in the AMAZE project consortium will present the objectives, activities and results of the AMAZE project in which 40 people from outside the company and 8 foreigners.

Expected number and profile of participants.

The number of participants expected in the workpackage WP1 belongs from all partners involved in AMAZE project Consortium,
1- University Politehnica of Bucharest (Romania) – Promoter project Assoc.Prof.Dr.Eng. Băilă Diana
2- Youriy Fedkovych Chernivtsi National University (Ukraina) – Responsible project Dean Igor Fodchuk
3- Poznan University of Technology (Poland) – Responsible project PhD. Remigiusz Labudzki
4- EDIBON Madrid (Spain) – Responsible project Director Myrian Judit Bonilla
The participants of the workpackage WP1 activities and results will be: students, professors, scientists, researchers from different universities and Research institutions, engineers from various industrial companies interested by the AMAZE project dissemination.

At the launch conference of the AMAZE project at the Polytechnic University of Bucharest Romania, TPM1, the managers and teachers, the key people from each institution participating in the AMAZE project, will meet, with 2 people from each institution participating (so a total of 8 people), of course other professors, engineers or researchers interested in the field of the project from the host institution and beyond will also join.
At the ME1 multiplier event that will take place at the Edibon company in Spain, 40 people from outside the company will participate, teachers, students, researchers, engineers, etc and 8 foreigners. interested in the field of the AMAZE project.
To carry out the activities of the course modules within IO1, each institution will choose the team of researchers/professors who will develop the course materials using modern teaching technologies and digital skills.
On the AMAZE project, the website is open acces to permit visit of all stakeholders interested by project domains.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

Work package n°3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

At Poznan University of Technology from Poland will host the Transnational Project Meeting of the AMAZE project, TPM2 (3 days), where the managers, project responsibles and professors, the key persons from each institution participating in the AMAZE project, will meet to monitoring the activities and the AMAZE project results, with 2 persons by each institutions (so a total of 8 people), of course other teachers interested in the field of the project from the host institution and beyond will also join.
During the AMAZE project, in Work package WP3, will take place two multiplication events: ME2 hosted by University Politehnica of Bucharest, Romania (being invited 20 persons from outside of university) and ME3 hosted by the Youriy Fedkovych Chernivtsi National University from Ukraine (being invited 20 persons from outside of university), which will take place between 15.01.2024-14.04.2024.
A very important activity will consist in the realization of the toolkit proposed within IO2 (Intellectual Outputs) within the AMAZE consortium, by each institution in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.04.2024.
The Staff Training will take place at Edibon company from Spain during 4 days, participating fro each partner institution 4 persons, which will take place between 15.01.2024-14.04.2024.
In each month will have Online meetings on ZOOM to: -monitoring activities of AMAZE project, - Detecting problems in project timeline - Input from all partners about created teams, and board and committees - Sharing expertise and discussions - Defining next steps for development of IOs.
All project partners will participate to realize the AMAZE e-toolkit manual for digital learning in producing complex design industrial parts
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility.

What will be the main results of this work package?

The main results of this work package WP3 consist in:
- AMAZE e-toolkit manual for digital learning in producing complex design industrial parts using new learning methods, for help the students to obtain practical and digital skills, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform. The AMAZE e-toolkit for developing of complex design industrial parts, will conceive the concepts of the new complex design of industrial parts, proving details related to the designed solutions used for conceiving the new complex design industrial parts, validation of the complex design industrial parts (solution designed by CAD systems based on CAE analyses), solutions related to the materials to be used for the realizing of new developed complex design industrial parts, Additive Manufacturing of the components to be realized for the new complex design industrial parts, description of assembling and programming of the systems, aspect related to the set-up/functionality of the presented solutions/repeatability of the process/troubleshoot and control; inputs regarding the methods of testing of these new developed complex design industrial parts by AR/VR – solutions conceiving, realizing and materializing of different scenarios in AR/VR used by students.
-The Multiplier Events realized at UPB (ROM) and YFCNU (UKR), having invited 20 persons (each university) from different companies, universities, research centers, will permit to a greater visibility of AMAZE project activities and results.
-The training staff will take part at Edibon company from Spain, where will participated 4 persons for each partner institution involved in AMAZE project, during 4 days.
- Within the AMAZE project consortium will be published articles in different International Conferences/ Journal with higher visibility.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

Quantity indicators KPI1. Number of participants (students, engineers, researchers, professors) participated at Multiplier Event ME2 (1day), realized at Youriy Fedkovych Chernivtsi National University (Ukraina) and KPI2. Multiplier Event ME3 (1 day) realized at University Politehnica of Bucharest from Romania. KPI3. Number of participants at Transnational Project TPM2 (3 days), sustained at Poznan University of Technology (Poland). KPI4. Staff Training that will be take at Edibon company, Spain
Methods - filling out attendance sheets.

Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%

- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials) > 80%.

Please describe the tasks and responsibilities of each partner organisation in the work package.

The following elements will also be addressed under these activities: - Ensure the project is established on robust and secure organizational structure with clearly defined management functions, combined with rigorous systems for activity and financial monitoring. - Ensure clear understanding by all partners of their specific responsibilities in the workplan and of the timing of detailed tasks. - Make best use of a full range of internal communication processes to ensure effective communication within the partnership, including an online collaborative environment. - Employ monitoring systems that follow successful models from previous Erasmus+ projects. All partners involved in AMAZE project consortium will contribute to IOs processes. Two multiplication events: ME2 hosted by University Politehnica of Bucharest, Romania (being invited 20 persons from outside of university) and ME3 hosted by the Youriy Fedkovych Chernivtsi National University from Ukraine (being invited 20 persons from outside of university), which will take place between 15.01.2024-14.04.2024. Edibon company from Spain will host the Staff Training during 4 days, participating from each partner institution 4 persons, which will take place between 15.01.2024-14.04.2024.
TPM2 - Second transnational project meeting (3 days) hosted by Poznan University of Technology (Poland) will take place between 15.01.2024-14.04.2024.
- 2 representatives from each AMAZE partners
- Detecting problems in project timeline
- The creation of the evaluation strategy for IOs based declared outputs (IO1, IO2) and the multiplier event (ME1, ME2, ME3) held at the same time
- common review of initial steps of IOs
- sharing expertise and iterative review of the progress
- discussions and continue with negotiations about the next steps for development
- sharing dissemination results and review of the PMI actions
-preparatory actions for development of the progress report
-review of expenses by each partner, results status

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

In terms of proper budget control, the Project Coordinator (P1) took the following preliminary actions:
- The budget was estimated based on the partners roles and responsibilities for each intellectual output and activities that needs to be covered under PMI and exceptional costs.
- The numbers of the days and costs are based on real costs of planned activities, internal rules of each partner organization with regards to the staff salary estimation and with reflection of rules by the general guide of Erasmus+ Programme 2023.
- The budget is very compact and includes only scheduled tasks described in the application
- The resources allocated are guaranteed by the involvement of well-qualified and experienced staff in project realization that will promise the European standard of final outcomes
See partners profiles and key staff involved at partners' profile sections above.
- The financial instalments will be delivered based on the achieved results by each partner listed as Annex to the partners' agreements.
- Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far.
- The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided.
- The proper time management will be also monitored by the internal quality manager P3 which will provide observations during Progress and Final stage of the project duration.
* Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule “money for value” by all partners.
For IO2: UPB – 2590 euro (days 35, grant per day 74); YFCNU – 1850 euro (days 25, grant per day 74); PUT – 2220 euro (days 30, grant per day 74); Edibon – 4100 euro (days 25, grant per day 25)
TOTAL IO2=10760 euro
ME2 (UPB) – 20 (participants from Romania=100 euro)=2000 euro
ME3 (YFCNU) – 20 (participants from Ukraine=100 euro)=2000 euro
TPM2 (PUT) – Poznan, Poland

UPB - 2 professors * 3 days; Individual Support=636; Travel=550; TOTAL 1186 (D3)
YFCNU- 2 professors * 3 days; Individual Support=636; Travel=550; TOTAL 1186 (D3)
Edibon - 2 participants * 3 days; Individual Support=636; Travel=720; TOTAL 1356 (D4)
Training Staff (Edibon) – Madrid, Spain
UPB - 4 professors * 4 days; Individual Support=1696; Travel=2120; TOTAL 3816 (D5)
PUT- 4 professors * 4 days; Individual Support=1696; Travel=1440; TOTAL 3136 (D4)
YFCNU- 4 professors * 4 days; Individual Support=1696; Travel=2120; TOTAL 3816 (D5)

The Erasmus+ information tables were used for the calculation of Travel according to distance and Individual Supports, Intellectual Outputs (number of days), etc.

Activities (3 - IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts	Ukraine	15/01/2024	14/04/2024	CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA)	Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO) , EDIBON International, S.A. (E10060431 - ES) , POLITECHNIKA POZNANSKA (E10208306 - PL)	29 256,00	AMAZE e-toolkit manual for digital learning in producing complex design industrial parts write by all participants. Multiplier Events: ME2 hosted by UPB (ROM) and ME3 hosted by YFCNU (UKR), articles published. Training staff feedbacks.
						29 256,00	

Description of the activities

Describe the content of the proposed activities.

The realization of the toolkit proposed within IO2 (Intellectual Outputs) within the AMAZE consortium is very important activity, and each institution participate in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.04.2024.
Poznan University of Technology from Poland will host the Transnational Project Meeting of the AMAZE project, TPM2 (3 days), where the managers, project responsibles and professors, the key persons from each institution participating in the AMAZE project, will meet to monitoring the activities and the AMAZE project results, with 2 persons by each institutions (so a total of 8 people), of course other teachers interested in the field of the project from the host institution and beyond will also join.
During the AMAZE project, in Work package WP3, will take place two multiplication events: ME2 (1 day) hosted by University Politehnica of Bucharest, Romania (being invited 20 persons from outside of university) and ME3 hosted by the Youriy Fedkovych Chernivtsi National University from Ukraine (being invited 20 persons from outside of university), which will take place between 15.01.2024-14.04.2024.
The Staff Training will take place at Edibon company from Spain during 4 days, participating fro each partner institution 4 persons (in total 16 persons), which will take place between 15.01.2024-14.04.2024.
In each month will have Online meetings on ZOOM to: -monitoring activities of AMAZE project, - Detecting problems in project timeline - Input from all partners about created teams, and board and committees - Sharing expertise and discussions - Defining next steps for development of IOs.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility. Accounting operations will be carried out regarding the payment of salaries for PMI and professors/engineers/reserachers involved in IOs. Timesheets will be completed.

Explain how this activity is going to help reach the WP objectives.

For the practical deepening of the knowledge acquired within the project, will take place the Intellectual outpouts IO2, which consista in e-toolkit manual for digital learning in producing complex design industrial parts. Through the use of new design/digital design software, such as GD, the realization and production of such surfaces becomes a reality. It is necessary to emphasize that generative design and its procedures are infinitely more efficient and effective than conventional CAD, CAE, CAM methods; In addition, internationally, the idea of incorporating material behavior into generative design is in its infancy. For results dissemination will take place two Multiplier Events: ME2 hosted by University Politehnica of Bucharest, Romania (being invited 20 persons from outside of university) and ME3 hosted by the Youriy Fedkovych Chernivtsi National University from Ukraine (being invited 20 persons from outside of university), which will take place between 15.01.2024-14.04.2024. The Staff Training will take place at Edibon company from Spain during 4 days, participating fro each partner institution 4 persons, to be presented new educational and digital skills and pedagogical and technical innovation in additive manufacturing, industrial engineering and design domains, the training will take place between 15.01.2024-14.04.2024. For monitoring the project activities and results will take part at Poznan University of Technology from Poland, the Transnational Project Meeting of the AMAZE project, TPM2, during for 3 days. For prepare ME/TPM/Training staff the host institution must to send invitations, to send announcements in newspapers, on the websites of partner institutions within the AMAZE project, on the AMAZE project website, to disseminate information related to the ME/TPM/Training staff of the project, to draw up the agenda for ME/TPM/Training staff with the topics, to make flyers, folders, roll-up with the event, minutes and report, catering and feedbacks.

Describe the expected results of the activities.

Based on the educational, practical and technical skills by the AMAZE consortium, the e-toolkit IO2 that are related to the field of of new industrial parts with complex design by Additive Manufacturing technologies are foreseen to be provided via the AMAZE platform that will be commonly used for teaching purposes by professors of the AMAZE consortium, but also outside the consortium (the set of toolkit will be offered on the AMAZE platform with open access).
AMAZE e-toolkit manual for digital learning in producing complex design industrial parts using new learning methods, for help the students to obtain practical and digital skills, saving time and for help the professors, permitting an easy teaching, increasing the teaching efficiency, reduction of teaching costs and integration of classroom and laboratory on the AMAZE platform. The AMAZE e-toolkit for developing of complex design industrial parts, will conceive the concepts of the new complex design of industrial parts, proving details related to the designed solutions used for conceiving the new complex design industrial parts, validation of the complex design industrial parts (solution designed by CAD systems based on CAE analyses), solutions related to the materials to be used for the realizing of new developed complex design industrial parts, Additive Manufacturing of the components to be realized for the new complex design industrial parts, description of assembling and programming of the systems, aspect related to the set-up/functionality of the presented solutions/repeatability of the process/troubleshoot and control; inputs regarding the methods of testing of these new developed complex design industrial parts by AR/VR – solutions conceiving, realizing and materializing of different scenarios in AR/VR used by students.
Two Multiplier Events will take place in the WP3 of AMAZE project: ME2 hosted by UPB(ROM) and ME3 hosted by YFCNU (UKR), for dissemination will publish articles in Conferences/Journals.

Expected number and profile of participants.

The number of participants expected in the workpackage WP3 belongs from all partners involved in AMAZE project Consortium,
1- University Politehnica of Bucharest (Romania) – Promoter project Assoc.Prof.Dr.Eng. Băilă Diana
2- Youriy Fedkovych Chernivtsi National University (Ukraina) – Responsible project Dean Igor Fodchuk
3- Poznan University of Technology (Poland) – Responsible project PhD. Remigiusz Labudzki
4- EDIBON Madrid (Spain) – Responsible project Director Myrian Judit Bonilla
The participants of the workpackage WP3 (IO2 - AMAZE e-toolkit manual for digital learning in producing complex design industrial parts) activities and results will be: students, professors, scientists, researchers from different Research institutions, engineers from various industrial companies interested by the AMAZE project dissemination.
At Training Staff hosted by Edibon company in Spain, participate 4 key persons, staff, professors from each institution involved in AMAZE project (in totally 16 persons from the partners) and of course the different interested persons from the host institution.
For TPM2 (UPB) will participate 2 staff, professors, key persons by each institution involved in project (Total 8 pers) and others. For TPM3 (PUT) will participate 2 staff, professors, key persons by each institution involved in project (Total 8 pers) and others.
-The Multiplier Events realized at UPB (ROM) and YFCNU (UKR), having invited 20 persons (each university) from different companies, universities, research centers, will permit to a greater visibility of AMAZE project activities and results and others.
On the AMAZE project, the website is open acces to permit visit of all stakeholders interested by project domains.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

Work package n°4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

At Edibon company from Spain will host the Transnational Project Meeting of the AMAZE project, TPM3 (3 days), where the managers, project responsibles and professors, the key persons from each institution participating in the AMAZE project, will meet to monitoring the activities and the AMAZE project results, with 2 persons by each institutions (so a total of 8 people), of course other professors, engineers, researchers or students interested in the field of the project from the host institution and beyond will also join.
During the AMAZE project to improve the educational, technical and digital skills of students, in a framework of communication and collaboration, which is one of the pre-conditions for a successful ERASMUS+ project, in Work package WP4, will take place the Summer School (10 days) hosted by University Politehnica of Bucharest, Romania (being invited 5 students and professors from each university partners involved in project and 2 staffs from the Edibon company), which will take place in period 15.04.2024-14.07.2024.
A very important activity will consist in the realization of the AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing (namely the virtual realization on the website of a 3D laboratory, so that students can enter and visualize how certain equipment works (basically some 3D videos with some equipment to show them how some equipment works, for example in my case a 3d printer or other equipment) proposed within IO3 (Intellectual Outputs) within the AMAZE consortium, by each institution in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.07.2024.
In each month will have Online meetings with the AMAZE project partners on ZOOM to know the status of project. In each month, will realize the papers necessary for pay salaries for the persons involved in the IOs.
Other AMAZE project results consist in articles published in Conferences/Journal.

What will be the main results of this work package?

-All teaching methods and resources realized within the AMAZE consortium (e-book, e-toolkit manual, e-learning platform), research activities in developing complex design industrial parts. and ideas shared through the AMAZE e-learning platform will be used for attracting the main stakeholders which are activating in the industrial engineering/design/additive manufacturing/architecture domains, all these stakeholders being encouraged through the organized events to join the AMAZE e-learning platform in order to realize finally one European Network for Additive Manufacturing in Industrial Design for Ukrainian Context formed by major EU institutions that are coming from the Higher education domain, SMEs, industrial companies, IT sector, etc. which are interested in using the resources of the AMAZE project (which will be shared on open access level) and could be actively involved further on in building of strategic partnerships for applying for different research or institutional EU projects.
-Most of the case studies launched on the level of the e-learning platform of AMAZE project will be defined in cooperation and based on the input provided by the major stakeholders that are activating in the field of industrial engineering/design/additive manufacturing/architecture. Sources and resources provided for students aims to reduce the drop-out rate of the students in the time of war from Ukraine. Better education, student impact and competence development, motivation at local level, as well as higher attractiveness for potential (graduate) students at Regional and National level are impact that are foreseen to be reached on the AMAZE consortium level. Increasing of the reputation in the university community and in company networks, as well as providing of higher attractiveness for potential (graduate) students, reputation among partner universities, reputation by significant publications are important KPIs that are expected to increase the project visibility.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

Quantity indicators KPI1. Number of participants (students, engineers, researchers, professors) participated at Summer School that will take place at University Politehnica of Bucharest, Romania. KPI2. Number of participants at Transnational Project TPM3, that will be take at Edibon company, Spain
Methods - filling out attendance sheets.

Quality indicators: KPI3. The quizzes addressed to students participating in the AMAZE project with questions appropriate to the subjects taught in the project
The learning material quality defined trough evaluation marks of questionnaires (IO3). KPI4. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: evaluation marks of questionnaires, number of participants that visit the AMAZE project website
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%
- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected

schedule and timing): >80%
- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, re

Please describe the tasks and responsibilities of each partner organisation in the work package.

The tasks and responsibilities of each partner organisation in the work package WP4 are:
-Edibon company P4 from Spain will host the Transnational Project Meeting of the AMAZE project, TPM3 (3 days), to monitoring the activities, sharing expertise and iterative review of the progress, detecting problems, discussions and negotiations and the AMAZE project results, will take place in period 15.04.2024-14.07.2024.
-In Work package WP4, will take place the Summer School hosted by University Politehnica of Bucharest, Romania P1 (being invited 5 students and professors from each university partners involved in project and 2 staffs from the Edibon company), which will take place in period 15.04.2024-14.07.2024.
The AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing (namely the virtual realization on the website of a 3D laboratory, so that students can enter and visualize how certain equipment works (basically some 3D videos with some equipment to show them how some equipment works, for example in my case a 3d printer or other equipment) proposed within IO3 (Intellectual Outputs) within the AMAZE consortium, by each institution in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.07.2024. The AMAZE e-learning VR/AR platform will be realized with help of all partners, especially P1 (UPB), P4 (Edibon).
In each month will have Online meetings with the AMAZE project partners on ZOOM to know the status of project. In each month, will realize the papers necessary for pay salaries for the persons involved in the IOs.
Other AMAZE project results consist in articles published in Conferences/Journal (all partners).

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

In terms of proper budget control, the Project Coordinator (P1) took the following preliminary actions:
- The budget was estimated based on the partners roles and responsibilities for each intellectual output and activities that needs to be covered under PMI and exceptional costs.
- The numbers of the days and costs are based on real costs of planned activities, internal rules of each partner organization with regards to the staff salary estimation and with reflection of rules by the general guide of Erasmus+ Programme 2023.
- The budget is very compact and includes only scheduled tasks described in the application
- The resources allocated are guaranteed by the involvement of well-qualified and experienced staff in project realization that will promise the European standard of final outcomes
See partners profiles and key staff involved at partners' profile sections above.
- The financial instalments will be delivered based on the achieved results by each partner listed as Annex to the partners' agreements.
- Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far.
- The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided.
- The proper time management will be also monitored by the internal quality manager P2 which will provide observations during Progress and Final stage of the project duration.
* Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule “money for value” by all partners.
For IO3: UPB – 2590 euro (days 35, grant per day 74); YFCNU – 1850 euro (days 25, grant per day 74); PUT – 2220 euro (days 30, grant per day 74); Edibon – 4100 euro (days 25, grant per day 25)
TOTAL IO3=10760 euro
Summer School (UPB), Bucharest Romania
Staff - Total 8520 euro
PUT – 2 professors * 10 days; Individual Support=2120; Travel=550; TOTAL 2670 (D3)
YFCNU– 2 professors * 10 days; Individual Support=2120; Travel=550; TOTAL 2670 (D3)
Edibon– 2 participants * 10 days; Individual Support=2120; Travel=1060; TOTAL 3180 (D5)
Students – Total 8550 euro
PUT – 5 students * 10 days; Individual Support=2900; Travel=1375; TOTAL 4275 (D3)
YFCNU– 5 students * 10 days; Individual Support=2900; Travel=1375; TOTAL 4275 (D3)
TPM3 (Edibon), Madrid Spain
Staff
UPB- 2 professors * 3 days; Individual Support=636; Travel=1060; TOTAL 1696 (D5)
PUT- 2 professors * 3 days; Individual Support=636; Travel=720; TOTAL 1356 (D4)

YFCNU- 2 professors * 3 days; Individual Support=636; Travel=1060; TOTAL 1696 (D5)
The Erasmus+ information tables were used for the calculation of Travel according to distance and Individual Supports, Intellectual Outputs (number of days), etc.

Activities (4 - IO3 - AMAZE e-learning VR/AR platform for virtual laboratory)

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
IO3 - AMAZE e-learning VR/AR platform for virtual laboratory	Spain	15/04/2024	14/07/2024	EDIBON International, S.A. (E10060431 - ES)	Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO) , CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA) , POLITECHNIKA POZNANSKA (E10208306 - PL)	32 578,00	AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing. Summer School feedbacks given by students and staffs involved in AMAZE project, articles published in Conferences/Journals with high impact
						32 578,00	

Description of the activities

Describe the content of the proposed activities.

The realization of the AMAZE e-learning VR/AR platform for programming and planning of customized industrial parts manufacturing (namely the virtual realization on the website of a 3D laboratory, so that students can enter and visualize how certain equipment works (basically some 3D videos with some equipment to show them how some equipment works, for example in my case a 3d printer or other equipment) proposed within IO3 (Intellectual Outputs) within the AMAZE consortium, by each institution in correlation and full collaboration, this activity that must be completed by the set deadline, i.e. 14.07.2024.
The Transnational Project Meeting of the AMAZE project, TPM3 (3 days), hosted by Edibon company P4 from Spain will monitor the activities, sharing expertise and iterative review of the progress, detecting problems, discussions and negotiations and the AMAZE project results, will take place in period 15.04.2024-14.07.2024. (List, feedback, reports, agenda)
-In the Summer School of AMAZE project, hosted by University Politehnica of Bucharest, Romania P1, the students will learn using the module courses and the toolkit manual, grace of the educational and scientific expertise of the universities professors involved in AMAZE project and company Edibon staff that will sustain the courses and the laboratories. which will take place in period 15.04.2024-14.07.2024.
Exchange of experience between universities, business sector and representatives from the human resources field developing a common tool and methodology have a positive impact on the quality of the projects implemented by partner organizations. During the project implementation, students are also expected to be impacted by the result. They will be more aware about the companies expectations and the Universities curriculum and modern teaching methods that are aimed to be implemented in the future in the context of digitalization.
Other AMAZE project results consist in articles published in Conferences/Journals.

Explain how this activity is going to help reach the WP objectives.

On each university involved in the AMAZE consortium, evaluation of Semester results, student Evaluation of Teaching are methods of evaluating the impact of AMAZE project on the local level. Questionnaires that will be requested to be fulfilled by the attending students at the AMAZE International summer schools which will provide feedback on the content of the e-courses, e-toolkit manual, as well as about their experience in using the e-learning platform in correlation with teaching process (easiness, clearness, coherence & interconnection between information provided by the teachers that are using the platform during their courses / different modules that are being followed are key indicators which will provide important feedbacks related to the quality and issues that still need to be improved on the teaching resources offered on the e-learning platform of AMAZE consortium. • there is also one important indicator on the e-learning platform of AMAZE project which can be taken into consideration for measuring the impact, such as the number of downloads of the e-courses / e-toolkit manual, number of people that have accessed the e-learning platform. Also the number of registered individuals that have been accessing the platform in order to register for the organized events will be one significant indicator. Communication team will be able to collect all these data. For the registration via the platform, some data will be required, such as the profile, it is important to know if the person who is accessing the platform is coming from the Higher education system & its profile (if he is a teacher, student, scientist), as well as if it coming from the industrial engineering sector / SMEs / etc. for building of the European Network for Additive Manufacturing in Industrial Design for Ukrainian Context (AMAZE network) at the end. Selection of the students for AMAZE Summer School will be made after the registration, via the e-learning platform and based on an interview.

Describe the expected results of the activities.

Number of teaching staff and students involved in Learning Teaching & Training / Multiplier events / International Summer school activities events is another quantified indicator. There is one system at regional and national level (at least in Romania) through which the zip-codes of study applicants and link the mean distance to overall attractiveness and visibility of study Programs are being monitored; as well as potential databases of stakeholders that are able to bring important contribution and are interested about the topic of the AMAZE project (Industrial Engineering / Design/Additive Manufacturing/Architecture). Identifying of colleagues in partner institutions who will acts as observers to help the AMAZE consortium in assessing the implementation of the AMAZE project is aimed to be performed by each member that is coming from the Higher Education domain. At the European and International level it will be possible to monitor the development of the international applications and citing/references of the scientific publications that will be made at the AMAZE consortium level.
Exchange of experience between universities, business sector and representatives from the human resources field developing a common tool and methodology have a positive impact on the quality of the projects implemented by partner organizations. During the project implementation, students are also expected to be impacted by the result. They will be more aware about the companies expectations and the Universities curriculum and modern teaching methods that are aimed to be implemented in the future in the context of digitalization.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility.

Expected number and profile of participants.

The number of participants expected in the workpackage WP4 belongs from all partners involved in AMAZE project Consortium,
1- University Politehnica of Bucharest (Romania) – Promoter project Assoc.Prof.Dr.Eng. Băilă Diana
2- Youriy Fedkovych Chernivtsi National University (Ukraina) – Responsible project Dean Igor Fodchuk
3- Poznan University of Technology (Poland) – Responsible project PhD. Remigiusz Labudzki
4- EDIBON Madrid (Spain) – Responsible project Director Myrian Judit Bonilla
The participants of the workpackage WP4 (IO3 - AMAZE e-learning VR/AR platform for virtual laboratory) activities and results will be: students, professors, scientists, researchers from different Research institutions, engineers from various industrial companies interested by the AMAZE project dissemination.
The Summer School (10 days) hosted by University Politehnica of Bucharest, Romania (being invited 5 students and 2 professors from each university partners involved in project and 2 staffs from the Edibon company), which will take place in period 15.04.2024-14.07.2024.
For TPM3 (3 days) realized at Edibon, where will participate 2 staff, professors, key persons by each institution involved in project (Total 8 pers) and others.
On the AMAZE project, the website is open acces to permit visit of all stakeholders interested by project domains.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

Work package n°5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)

What are the specific objectives of this work package and how do they contribute to the general objectives of the project?

The specific objectives of the work package WP5 and how do they contribute to the general objectives of the AMAZE project consist in Intellectual Output IO4 - AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models), the partners from Poznan University of Technology (Poland) and University Politehnica of Bucharest (Romania) will be responsibles to chosen four cases of industrial parts with complex forms to design, using CAD/CAM/CAE software, to optimize them and to producing via the innovative Additive Manufacturing processes, will take place during the period 15.07.2024-14.09.2024.
-The Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, will permit to a greater visibility of AMAZE project activities and results, will take place in period 15.07.2024-14.09.2024.
In this way based on the category division invitations could be made for future Multiplier events organized in the project, but also invitations might be send for building strategic partnerships in one topic of interest related to the industrial, design, additive manufacturing, architecture sectors / similar or complementary to the main topic of the AMAZE project if such opportunities occur.
About all these stakeholders that are accessing the AMAZE platform and are using resources, important feedbacks can be collected in the form of questionnaires.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility.
An important specific objective consists in realization of the AMAZE final report to be sent to Erasmus+ Agency, for monitoring and feedback of AMAZE results.

What will be the main results of this work package?

The main results of the work package WP5
The list of participants and feedbacks at Multiplier Events existing in AMAZE proposal project, especially the number of them (if are from other countries) they give the event an international dimension, increasing the visibility of the results and activities carried out in the project. The Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, will permit to a greater visibility of AMAZE project activities and results, will take place in period 15.07.2024-14.09.2024.
In order to combine the practical part with the course modules, 4 case studies of industrial parts with complex forms to design (some 3D models, cases of design or architectural models), will be presented (Intellectual Outputs IO4) that will be proposed by the partners from Poland and Romania, these case studies aim to develop design, digital and manufacturing skills of students and for all participants to AMAZE project, all stakeholders interested by these domains. The number of visualizations on AMAZE site and the number of courses, toolkit and cases downloaded is other dissemination method of AMAZE project results.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility.
The AMAZE final report including all activities, tasks, responsibilities, costs and results of all partners involved in AMAZE project represent other important result of the partners work that will be sent to Erasmus+ Agency, for monitoring and feedback of AMAZE results.

What qualitative and quantitative indicators will you use to measure the level of the achievement of the work package objectives and the quality of the results?

Quantity indicators KPI1. Number of participants (students, engineers, researchers, professors) participated at Multiplier Event ME4, realized at at Poznan University of Technology (Poland).
Methods - filling out attendance sheets, feedbacks of ME4.

Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Quality indicators: KPI3. The AMAZE portal accessibility and usability (IO1, IO2, IO3, IO4)
Methods: number of participants that visit the AMAZE project website
Therefore, from a qualitative perspective, supplementary to the overall indicators provided above, the following impact indicators are foreseen to be reached:
- activities implemented according to the project's timelines: >95%
- an accomplishment of the project objectives: >95%
- objectives of each transnational meetings have been clear to participants: >80%
- satisfaction of participants to the transnational project meetings (logistical arrangements, facilitation skills, respected schedule and timing): >80%

- quality of the intellectual outputs prepared by all partners: >95%
- learning objectives for the international training sessions have been met: >85%
- satisfaction of participants to the international training sessions (logistical arrangements, facilitation skills, respected schedule and timing): >80%
- satisfaction of participant in the training (summer school) activities : >80%
- overall project quality assessment (made by partners): >80%
- satisfaction of participants to the multiplier events meeting (logistical arrangements, facilitation skills, respected schedule and timing, prepared materials) > 80%.

Please describe the tasks and responsibilities of each partner organisation in the work package.

The tasks and responsibilities of each partner organisation in the work package WP5 are:
-In Work package WP5, will take place the Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, that will permit to a greater visibility of AMAZE project activities and results, having place in period 15.07.2024-14.09.2024.
-The 4 case studies of industrial parts with complex forms to design (some 3D models, cases of design or architectural models), will be presented (Intellectual Outputs IO4) that will be proposed by the partners from Poland and Romania, these case studies aim to develop design, digital and manufacturing skills of students and for all participants to AMAZE project, all stakeholders interested by these domains and will realized in period 15.07.2024-14.09.2024.
. The number of visualizations on AMAZE site and the number of courses, toolkit and cases downloaded is other dissemination method of AMAZE project results.
Other AMAZE project results consists in articles published in different International Conferences/International Journal with higher visibility, that will monitored the Poznan University of Technology (Poland) P3.
The AMAZE final report, realized by University Politehnica of Bucharest P1, including all activities, tasks, responsibilities, costs and results of all partners involved in AMAZE project represent other important result of the partners work that will be sent to Erasmus+ Agency, for monitoring and feedback of AMAZE results.
Accounting operations will be carried out by all AMAZE project partners, regarding the payment of salaries for PMI and professors/engineers/reserachers involved in IOs. Timesheets will be completed.

Please explain how you define the amount dedicated to the work package and how the work package is cost-effective ?

In terms of proper budget control, the Project Coordinator (P1) took the following preliminary actions:
- The budget was estimated based on the partners roles and responsibilities for each intellectual output and activities that needs to be covered under PMI and exceptional costs.
- The numbers of the days and costs are based on real costs of planned activities, internal rules of each partner organization with regards to the staff salary estimation and with reflection of rules by the general guide of Erasmus+ Programme 2023.
- The budget is very compact and includes only scheduled tasks described in the application
- The resources allocated are guaranteed by the involvement of well-qualified and experienced staff in project realization that will promise the European standard of final outcomes
See partners profiles and key staff involved at partners' profile sections above.
- The financial instalments will be delivered based on the achieved results by each partner listed as Annex to the partners' agreements.
- Every three months the partners will be obliged (this will be included as clause in their bilateral agreements) to provide completed timesheets, pay slips, payrolls and proofs for expenditures that they did so far.
- The time management will be reviewed during monthly online meetings and the Coordinator will ensure that unreasonable delays will be avoided.
- The proper time management will be also monitored by the internal quality manager P2 which will provide observations during Progress and Final stage of the project duration.
* Overall, the project budget is carefully balanced and considers the operational and financial capacity of each partner. This will be ensured also by a sound financial management which will be followed, as well as the rule "money for value" by all partners.
For IO4: UPB – 2590 euro (days 35, grant per day 74); YFCNU – 1850 euro (days 25, grant per day 74); PUT – 2220 euro (days 30, grant per day 74); Edibon – 4100 euro (days 25, grant per day 25)
TOTAL IO4=10760 euro
ME4 (PUT) – 20 (participants from Poland=100 euro)=2000 euro+ 5 foreigners participants (=200euro) = 3000 euro

The Erasmus+ information tables were used for the calculation of Travel according to distance and Individual Supports, Intellectual Outputs (number of days), etc.

Activities (5 - IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models))

In the following sections, you are asked to provide details about each activity of the work package.

You are asked to provide information about each planned activity as a whole (e.g. its venue, duration, estimated number of participants etc.), to define the activity's lead organisation, and optionally to list the other participating organisations. The lead organisation is typically the one organising the activity. The other participating organisations are all other project partners who will also take part in the particular activity. The estimated activity start and end dates can be changed during implementation.

Please specify each of the planned project activities in the table below

Activity title	Venue	Estimated start date	Estimated end date	Leading Organisation	Participating Organisations	Amount allocated to activity (EUR)	Expected results
IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models)	Poland	15/07/2024	14/09/2024	POLITECHNIKA POZNANSKA (E10208306 - PL)	Applicant - UNIVERSITATEA POLITEHNICA DIN BUCURESTI (E10208641 - RO) , CHERNIVTSI NATIONAL UNIVERSITY YURIY FEDKOVYCH (E10207348 - UA) , EDIBON International, S.A. (E10060431 - ES)	13 760,00	AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies. Multiplier Event: ME4 hosted by PUT (POL). Articles published. Final report.
						13 760,00	

Description of the activities

Describe the content of the proposed activities.

Input will be required from the University Politehnica of Bucharest P1 and the Poznan University of Technology (Poland) P3 since they have lot of case studies which they have developed so far for other ERASMUS / HORIZON projects and also for training purposes using AR/VR / mixed reality applications. These e-case studies will be chosen in collaboration with all AMAZE consortium project.
Other AMAZE project activity is the Multiplier Event of AMAZE project hosted by the Poznan University of Technology (Poland) P3, The Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, will permit to a greater visibility of AMAZE project activities and results., will take place in period 15.07.2024-14.09.2024.
For prepare Mutiplier Event, the host institution must to send invitations, to send announcements in newspapers, on the websites of partner institutions within the AMAZE project, on the AMAZE project website, to disseminate information related to the Multiplication Event of the project, to draw up the agenda for ME with the topics that will be discussed, to make flyers, folders, roll-up with the event, to purchase catering services, to make attendance lists at the multiplication event and feedback of the multiplication event.
In order to make the final report of the AMAZE project, all partners will be contacted in order to send the accounting documents, the courses, the toolkit, all the articles published with the acknowledgment of the project, all the attendance lists and the feedback from TPM made by all the partners involved in the project, the pictures taken during the AMAZE project implementation, all attendance lists and feedback for the multiplication events carried out, agendas for TPM and ME, minutes and reports of these events in order to send and upload them to the Agency's website. Another activity consists in updating the website of the project.

Explain how this activity is going to help reach the WP objectives.

Since AMAZE consortium has high expertise in this context, with all stakeholders involved in this direction, there are several activities: 1. Chapters that might be used by students for BSc projects / reports that emphasize the case studies and use of AMAZE resources in developing, producing or testing new industrial products with complex design (reports will be shared via the e-learning platform of AMAZE project in open-access mode); 2. Preparing of academic/scientific publications (ISI with impact factor) that comprises students, professors, scientists based on the specific case studies developed, tested and produced using the AMAZE resources is also one result that is foreseen to be reached on disseminating stage level. 3. Case studies developed, tested and made at this level will provide important feedbacks regarding the AMAZE resources and regarding the industrial products with complex design manufactured by innovative Additive Manufacturing processes, so as the proposed solutions are expected be implemented at one very practical level. Publishing of the most important results reached in an "open access" book" and "open access" toolkit manual is also one target regarding disseminating of the results reached on the level of the AMAZE consortium at the end. 4. Since topic of the AMAZE project and content is in the interest of technical universities, companies, transfer of know-how from the universities engaged in the AMAZE consortium to these institutions, as well as building strategic partnerships and applying for new EU projects is highly foreseen to be reached at dissemination level in the future as well.
The students and the professors should be able to upload their own industrial parts with complex forms and applications on the e-learning platform and should be able to do the programming for testing them using the AMAZE platform. AR/ VR/ mixed reality applications should be able to be downloaded by the professors and students to be used for teaching purposes

Describe the expected results of the activities.

Number of teaching staff and students involved in Learning Teaching & Training / Multiplier events / International Summer school activities events is another quantified indicator. There is one system at regional and national level (at least in Romania) through which the zip-codes of study applicants and link the mean distance to overall attractiveness and visibility of study Programs are being monitored; as well as potential databases of stakeholders that are able to bring important contribution and are interested about the topic of the AMAZE project (Industrial Engineering / Design/Additive Manufacturing/Architecture). Identifying of colleagues in partner institutions who will acts as observers to help the AMAZE consortium in assessing the implementation of the AMAZE project is aimed to be performed by each member that is coming from the Higher Education domain. At the European and International level it will be possible to monitor the development of the international applications and citing/references of the scientific publications that will be made at the AMAZE consortium level.
Exchange of experience between universities, business sector and representatives from the human resources field developing a common tool and methodology have a positive impact on the quality of the projects implemented by partner organizations. During the project implementation, students are also expected to be impacted by the result. They will be more aware about the companies expectations and the Universities curriculum and modern teaching methods that are aimed to be implemented in the future in the context of digitalization.
An important project results is the number of visualizations on AMAZE site and the number of courses, toolkit and cases downloaded is other dissemination method of AMAZE project results.
Other AMAZE project results consists in articles published in Conferences/International Journals monitored the PUT - P3 and AMAZE Final Report realized by Coordinator UPB - P1.

Expected number and profile of participants.

The number of participants expected in the workpackage WP5 belongs from all partners involved in AMAZE project Consortium,
1- University Politehnica of Bucharest (Romania) – Promoter project Assoc.Prof.Dr.Eng. Băilă Diana
2- Youriy Fedkovych Chernivtsi National University (Ukraina) – Responsible project Dean Igor Fodchuk
3- Poznan University of Technology (Poland) – Responsible project PhD. Remigiusz Labudzki
4- EDIBON Madrid (Spain) – Responsible project Director Myrian Judit Bonilla
The participants of the workpackage WP5 (IO4 – AMAZE e-case studies for project-based learning method used in developing, testing and manufacturing of customized industrial parts by Additive Manufacturing technologies (some 3D models, cases of design or architectural models) activities and results will be: students, professors, scientists, researchers from different Research institutions, engineers from various industrial companies interested by the AMAZE project dissemination.
-The Multiplier Event ME4 realized at PUT (POL), having invited 20 persons from different companies, universities, research centers (out of PUT) and 5 foreigner's participants, will permit to a greater visibility of AMAZE project activities and results.
On the AMAZE project, the website is open acces to permit visit of all stakeholders interested by project domains.
The final report of AMAZE project will be realized in collaboration with all project partners.

Please keep in mind that the Erasmus+ Programme is offering co-financing for your project. This means that the EU grant can only cover a part of the project costs, while the rest must be covered by the participating organisations either in form of additional funding, or in form of invested goods, services and work.

Annexes

The maximum size of a file is 15 MB and the maximum total size is 100 MB.

Declaration on Honour

Please download the Declaration on Honour, print it, have it signed by the legal representative and attach.

File Name	File Size (kB)
DOH -Declaration on honour UPB.pdf	1 406
Total Size (kB)	**1 406**

Mandates

Please download the mandates, have them signed by the legal representatives and attach them here. You can add a maximum of 90 documents.

Please ensure that mandates are valid before submitting them to the National Agency. Mandates shall be provided at the latest before the signature of the grant agreement.

File Name	File Size (kB)
MAN -Mandate_Poland.pdf	402
MAN -Mandate_Spain.pdf	365
MAN -Mandate_Ukraine.pdf	337
Total Size (kB)	**1 106**

Other Documents

If needed, please attach any other relevant documents (a maximum of 9 documents). Please use clear file names.

If you have any additional questions, please contact your National Agency. You can find their contact details here: List of National Agencies.

File Name	File Size (kB)
OTH -AMAZE budget for each partner.pdf	106
Total Size (kB)	**106**

Total Size (kB)	**2 619**

Checklist

Before submitting your application form to the National Agency, please make sure that:

☑ It fulfills the eligibility criteria listed in the Programme Guide.

☑ All relevant fields in the application form have been completed.

☑ You have chosen the correct National Agency of the country in which your organisation is established. Currently selected NA is: RO01 - Agentia Nationala pentru Programe Comunitare in Domeniul Educatiei si Formarii Profesionale

Protection of Personal Data

Please read our privacy statement to understand how we process and protect your personal data

Please also keep in mind the following:

Mandates of each partner to the applicant, signed by both parties, should be submitted latest before the signature of the grant agreement. If the application is approved for funding, signed mandates will be considered as a condition for signature of the grant agreement.

The documents proving the legal status of the applicant must be uploaded in the Organisation Registration System, here: Organisation Registration System

Submission History

Version	Submission time (Brussels time)	Submission ID	Submission status