

P15 - National Technical University of Ukraine “Kyiv Polytechnic Institute”



Final report of

MMATENG

project



Tempus



<http://mmateng.eu>

<http://tempus.iff.kpi.ua/>

Plan

- 1. Development of programmes and courses**
- 2. Training activities for staff and students**
- 3. Equipment**
- 4. Dissemination and sustainability**
- 5. Publishing**
- 6. Joint activities between universities of consortium**

1. Development of programmes and courses

- In accordance with the workplan of the project 6 educational plans / 41 curricula **were analyzed**, including:
- Department of High-temperature and Powder Metallurgy – 2 educational plans / 15 curricula,
 - Department of Metal Science and Thermal Treatment – 2 educational plans / 15 curricula,
 - Department of Physics of Metals – 2 educational plans / 11 curricula.

1. Development of programmes and courses

Totally updated and new courses – 24.

High-temperature Materials and Powder Metallurgy department – 6:

Bachelor:

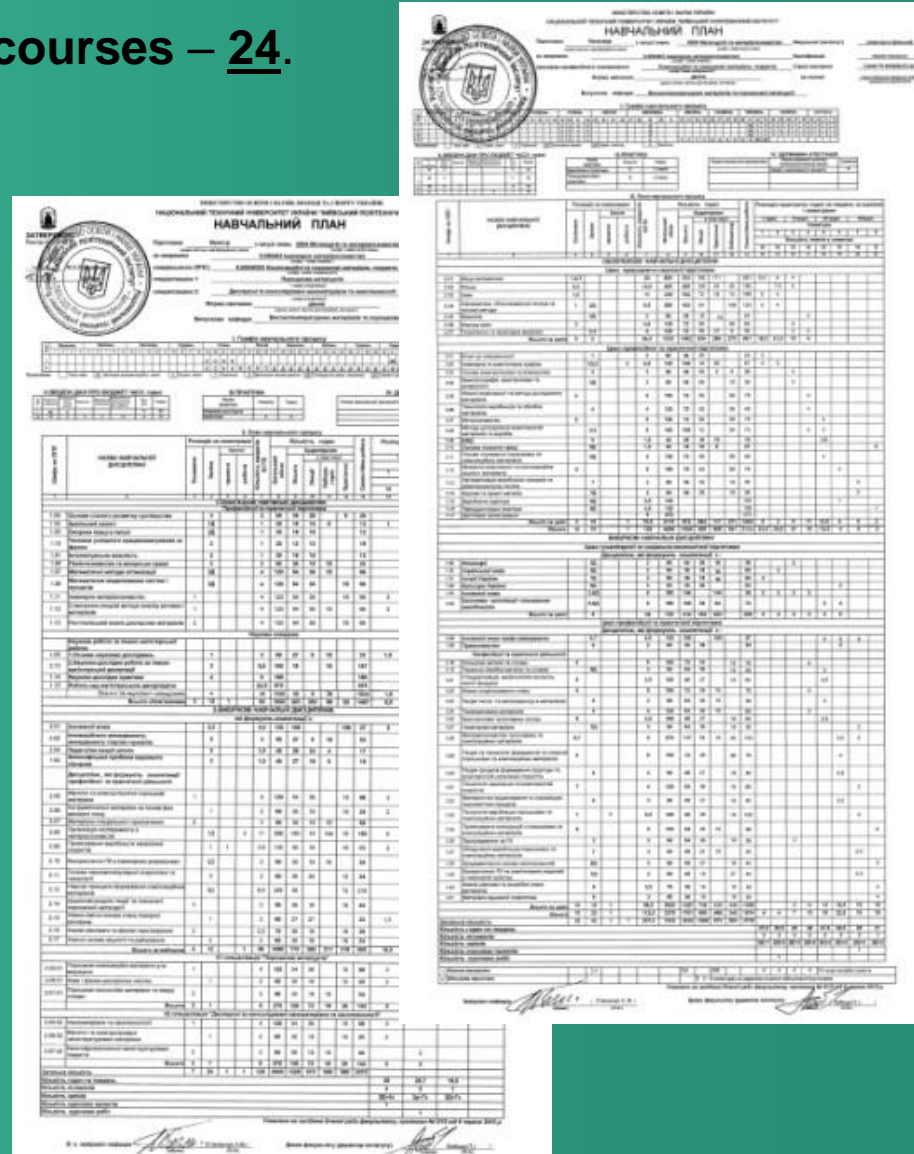
1. Mechanical properties and structural strength of materials (48 students);
2. Non-metallic materials (48 students).

Master:

1. Using PC in engineering calculations (26 students)
2. Electron-probe methods of research (26 students);
3. Factors for successful employment (26 students);
4. Innovation management, start-up projects management (26 students).

Mandatory: 5 curricula.

Selected: 1 curricula.



1. Development of programmes and courses

Metals science and thermal treatment department

- 11:

(4) Courses for masters (7) for bachelors (58 bachelors and 17 masters) students studying.

Updated:

1. Mechanical properties and structural strength of materials
2. Materials Science
3. New materials and methods of research
4. Mechanical properties and structural strength of materials: Additional sections
5. Corrosion and Protection of Metals
6. Non-metallic materials
7. Fundamental principles of nanotechnology
8. Nanotechnology and Nanomaterials
9. Factors for successful employment by specialty

New:

1. Material selection (with the use of CES-software)
2. CAD-CAM - CAE Siemens NX

Mandatory: 4 curricula.

Selected: 7 curricula.



The image displays three detailed curriculum tables for the Metals science and thermal treatment department. Each table includes a header with the department name and a list of courses with their respective credits and student numbers. The tables are organized into columns for course details, credits, and student numbers. The tables are signed and dated at the bottom.

1. Development of programmes and courses

Physic of Metals department – 7:

Bachelor:

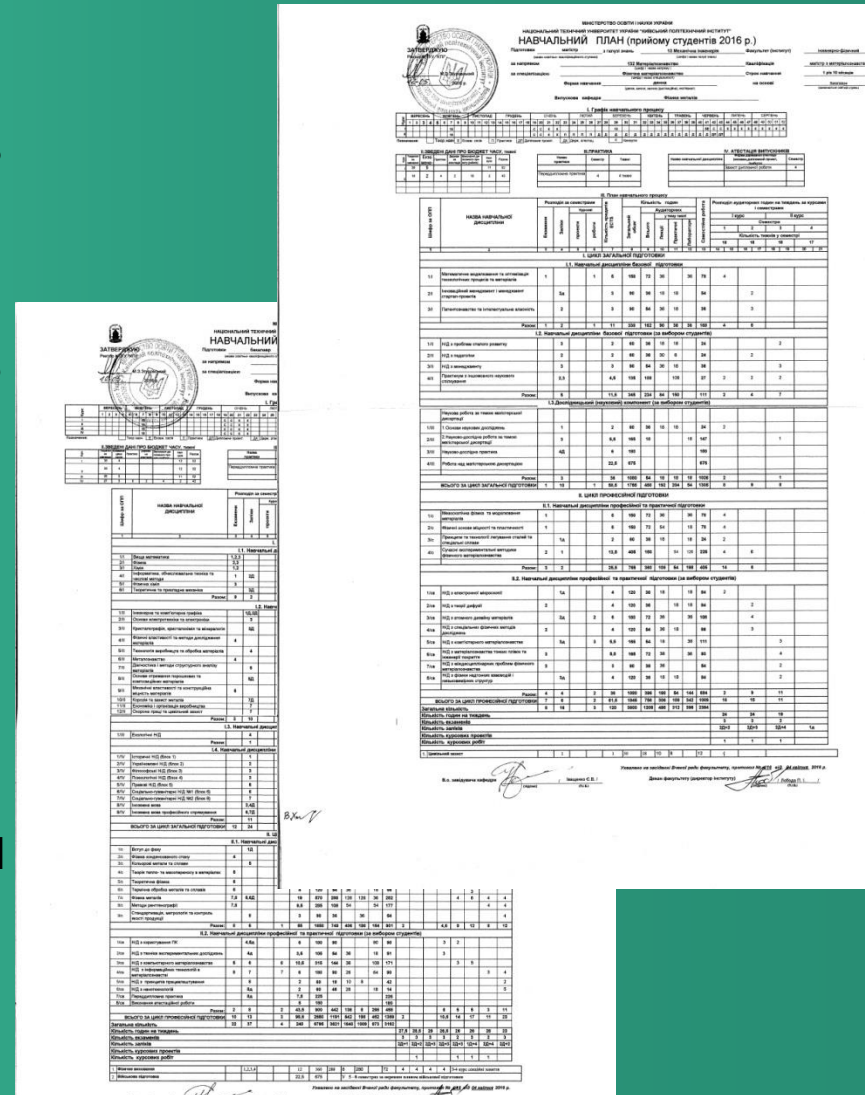
1. Methods of studying the properties of materials and products: 2 - Methods for the structural analysis of materials (115 bachelor students).
2. Electron microscopy (bachelors 31 students).
3. Materials and Coatings Engineering (bachelors 31 students).
4. Physical material: 1 - Non-ferrous metals (37 bachelor students).
5. Mechanical properties and structural strength of materials (37 bachelor students).

Master:

1. Physical basis of strength and plasticity (Masters 21 students).
2. Factors for successful employment (Masters 21 students).

Mandatory: 4 curricula.

Selected: 3 curricula.



The image shows two pages of educational program documents. The top page is a 'НАЧАЛЬНИЙ ПЛАН (приёмку студентов 2016 г.)' (Initial Plan for 2016 student admission) from the Faculty of Metallurgy and Materials Engineering. It includes a table of subjects and credits. The bottom page is a 'Учебный план' (Study Plan) for a specific program, detailing subjects, credits, and workload.

1. Development of programmes and courses

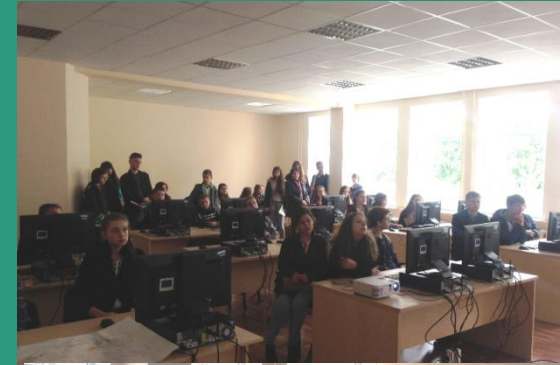
- Main target groups: students of different specialties and faculties (Faculty of Physical Engineering, Faculty of Welding, Institute of Mechanical Engineering, etc.), students of part-time forms of training, university teachers, and post-graduate students.
- During the project's running (2013-2017) approximately 568 students and other listeners have been already attended.
- All curricula are accredited at the university and national level.
- The teaching materials are approved at the university level.
- Teaching materials for new and updated courses have been reviewed on the Faculty level with participation of the professors and scientists from the National Academy of Science of Ukraine and different stakeholders.

1. Development of programmes and courses

➤ On 2014-15 education year the pilot teaching and in 2015-16 and 2016-17 a full-fledged teaching of methodology of working with the CES software complex for students of the 5th year of the High-temperature Materials and Powder Metallurgy department started in the framework of the renewed discipline "Application of PC in engineering calculations".

➤ Within the discipline the English version of the package was used. Some tasks are performed in English.

➤ From 2016-17 academic year teaching 3-dimensional modeling of elements with the relevant calculations in PTC Creo environment is carried out for students of the 4th year in the discipline "Application of PC and computer models in engineering practice" (bachelors 28 students).



CERTIFICATE of ACHIEVEMENT

This is to certify that

Mykyta Upatov

is recognised by Granta Design as completing the

CES Selector Certificate Program - Certified User

May 30th, 2016



Dr. Charles Brabin
CES Selector Product Manager



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MATERIAL INTELLIGENCE

2. Training activities for staff and students

Training activities for staff:

In accordance with the workplan of the project the groups of teachers for trainings in 2015 at the universities of EU: TUB (DE), KU Leuven (BE) and KP (PL) were formed.

List of trainings participants:

1. Stepanov O.V., Assoc. Prof. of High-temperature materials and powder metallurgy department.
2. Bogomol I.I., Assoc. Prof. of High-temperature materials and powder metallurgy department.
3. Troshnikoval.Yu., ассистент Assoc. Prof. of High-temperature materials and powder metallurgy department.
4. Biba I.G., Assist. Prof. of High-temperature materials and powder metallurgy department.
5. Dudka O.I., Assoc. Prof. Metal science and thermal treatment department.
6. Arshuk M.V., Assist. Prof. Metal science and thermal treatment department.
7. Vladimirskii I.A., Assist. Prof. Metal physics department.
8. Kholiavko V.V., Assoc. Prof. Metal physics department.



2. Training activities for staff and students

Training activities for students:

7 master-classes on April 25-26, 2016 were held with participation of European partners (Annexes 4.1, 4.2):

- „Soft Skills for Engineers and Employability”, Elena Eyngorn (TUB)
- “Stainless Steels”, Prof Jean Bernard Vogt
- “CES- Materials Selection”. Claes Frederiksson (CES-Grantadesign)
- “Next-generation Strengthening technologies of materials treatment”, Prof Oleksandr Cheyliakh (PSTU)
- “Introduction to Business Plan - useful tools for support market analysis, scheduling and estimation” , Kinga Korniejenko & Prof Janusz Mikuła (CUT)
- “The basic of knowledge about bio-composites and bio-degradable materials”, Stanisław Kuciel (CUT)
- “Fatigue of Metals”, Prof Jean Bernard Vogt

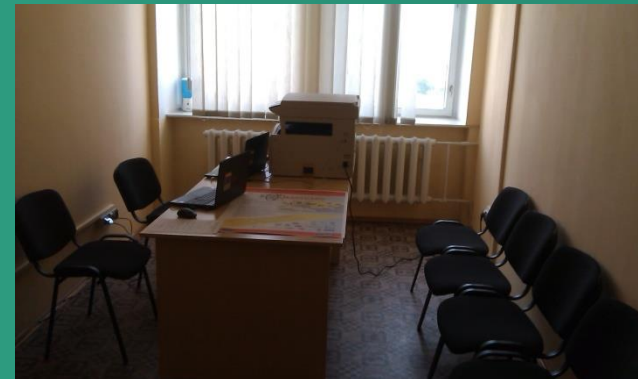
The quantity of involved students: near 300.



3. Equipment

It was purchased:

- ✓ HP Z230 SFF Workstation – 17 pcs.
- ✓ HP Z23i 23-Inch IPS Monitor – 17 pcs.
- ✓ Notebook Fujitsu AH544M73B5 15.6" AG Intel i3-4000M/4/500/DVD/NVD720-2/WiFi/BT/NoOS– 2 pcs.
- ✓ PC HP 400PD MT G1840\4Gb RAM\500Gb HDD\DOS – 1 item.
- In accordance with the workplan of the project in January 2016 the MESO office (location: build. 9 of NTUU “KPI”, room 223) and in April 2016 the MITL laboratory (location: build. 9 of NTUU “KPI”, room 104) were created.
- The MESO office equipped by 2 working places with 2 Fujitsu notebooks.
- The MITL laboratory equipped by 17 working places with HP Z230 workstations PC HP 400PD as the server.
- The studying was started for master students (5 course of High-temperature Materials and Powder Metallurgy department of Faculty of Physical Engineering) using CES software.
- From the 2016-2017 educational year in MITL laboratory are studied:
 - 12 academic groups (bachelors and masters) from different courses and departments (5 departments of Faculty of Physical Engineering);
 - PhD students;
 - staff;
 - schoolchildren (Minor Academy of Science of Ukraine).
- Used software: CES Edupack, PTC Creo, IT.
- By the results of studying 10 students of High-temperature Materials and Powder Metallurgy department of Faculty of Physical Engineering obtained CES certificates.



3. Equipment

- All purchased equipment are fully used in the classroom. It is created the laboratory of information technologies in materials science (MITL), in which the classes for all departments of Faculty Physical Engineering as well as various workshops and professional orientation activities are carried out. The MESO office equipment is also used for various events and meetings with stakeholders as well as for educational process and of professional orientation activities.
- In future it is planned to expand the use of all purchased equipment by expanding the number of courses that have been developed within the project to other departments of the Faculty and the University as well as by modernization and procurement of new software for training specialists of different levels (bachelor, master, PhD) in Materials Science and other related areas. Also planned use of equipment MITL and MESO office for the dissemination and sustainability of the project results.

4. Dissemination and sustainability

1. Presentation of the project for heads of departments and methodists of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 14.03.2014, NTUU “KPI”.
2. Presentation of the project on Academic Council of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 31.03.2014, NTUU “KPI”.
3. Presentation of the project on High-temperature materials and powder metallurgy department of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 03.04.2014, NTUU “KPI”.
4. Presentation of the project on Metal science and thermal treatment department of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 03.04.2014, NTUU “KPI”.
5. Presentation of the project on Metal physics department of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 03.04.2014, NTUU “KPI”.
6. Presentation of the project on the Presidium meeting of the National Academy of Science of Ukraine. 02.04.2014.
7. Presentation of the project for students, PhD students, teachers and staff of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute». 15.05.2014, NTUU “KPI”.
8. Presentation of the project on the conference «Day of young researcher», Kyiv, Dragomanov National Pedagogical University, 15.05.2014.
9. Presentation of the project on the international conference «New materials and techniques in mechanical engineering». May 20, 2014. NTUU «KPI».
10. Presentation of the project on the 4th international Samsonov’s conference «Materials science of refractory compounds». May 21, 2014. Kyiv, Ukraine.
11. Presentation of the project in OttovonGuerickeUniversityMagdeburg (Germany). July, 2014. Magdeburg, Germany.
12. Presentation of the project results on wide Academic Council of the Physical Engineering Faculty of the National Technical University of Ukraine «Kyiv Polytechnic Institute» for 70th anniversary of the Faculty, 11.12.2014, NTUU “KPI”.
13. Presentation of the training course results on the Metal physics department, 09.02.2015, NTUU “KPI”.
14. Presentation of the project and training course results on High-temperature materials and powder metallurgy department, 12.03.2015, NTUU “KPI”.
15. Presentation of the training course results on the Metal science and thermal treatment department, 22.04.2015, NTUU “KPI”.
16. Presentation of the training course results on wide Academic Council of the Physical Engineering Faculty, 27.04.2015, NTUU “KPI”.
17. Lecture of I. Bogomol “International projects in materials science” for participants of Young Academy of Science of Ukraine, July 2015, Kyiv, Ukraine.
18. Appearance of Prof. P. Loboda on the opening of 5th International conference “HighMatTech”, October 5, 2015, Kyiv, Ukraine.
19. Appearance of Prof. P. Loboda on the opening of International conference “Materials for the extreme environments”, December 3, 2015, Kyiv, Ukraine.
20. Lecture of Prof. P. Loboda on the session “Modern materials in science and technology” for participants of Young Academy of Science of Kyiv region, December 22, 2015, Kyiv, Ukraine.
21. The key-note of Katiukha O.M., Kholiavko V.V. Perception of teaching students competence-based approach in the study technical disciplines at direction "Engineering materials" on 9th International conference of students, PhD students and young scientists «Perspective technologies on the base of newest physical-material science investigations and computer design of materials», April 14-15, 2016, Kyiv, Ukraine.
22. Appearance of Prof. P. Loboda on the conference “Day of young researcher”, May 19, 2016, Kyiv, Ukraine.
23. Appearance of Prof. P. Loboda on the opening of International conference “Material science of refractory compounds and composites”, May 24, 2016, Kyiv, Ukraine.
24. International Scientific-Methodological Conference “Materials for use in extreme conditions – 6”.



4. Dissemination and Sustainability

<http://tempus.iff.kpi.ua/en/>

http://ipd.kpi.ua/documents/narady/14-05-2015/Tempus%20MMATENG_14.05.2015.pptx

http://ipd.kpi.ua/documents/materials/%D0%95%D0%A0%D0%90%D0%97%D0%9C%D0%A3%D0%A1+/Tempus_IV_2014.xls

<http://www.slideserve.com/hakan/mmateng-eu>

<https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=12&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas->

[A8A4ChAWCBswAQ&url=http%3A%2F%2Fwww.pstu.edu%2Ffileadmin%2Ffiles%2Finternational%2FMMATENG%2Fpartner_presentations%2FKIEV.ppt&usg=AFQjCNFaWdfFlvjEeww5Jpv6lppUpytB7g&sig2=TUNTyBvX0sYuHicGxcNqfg&bvm=bv.122852650,d.bGg](https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas-A8A4ChAWCBkAA&url=http%3A%2F%2Ferasmusplus.org.ua%2Fkorysna-informatsiia%2Fkorysni-materialy%2Fcategory%2F6-novyny-ta-baza-proektiv.html%3Fdatabase&usg=AFQjCNFSPC743tl6RWnNCB8oR3JX7ZTqiw&oc_el6X7ms0WsfwUw&bvm=bv.122852650,d.bGg)

[https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas-A8A4ChAWCBkAA&url=http%3A%2F%2Ferasmusplus.org.ua%2Fkorysna-informatsiia%2Fkorysni-](https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas-A8A4ChAWCBkAA&url=http%3A%2F%2Ferasmusplus.org.ua%2Fkorysna-informatsiia%2Fkorysni-materialy%2Fcategory%2F6-novyny-ta-baza-proektiv.html%3Fdatabase&usg=AFQjCNFSPC743tl6RWnNCB8oR3JX7ZTqiw&oc_el6X7ms0WsfwUw&bvm=bv.122852650,d.bGg)

[materialy%2Fcategory%2F6-novyny-ta-baza-proektiv.html%3Fdatabase&usg=AFQjCNFSPC743tl6RWnNCB8oR3JX7ZTqiw&](https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas-A8A4ChAWCBkAA&url=http%3A%2F%2Ferasmusplus.org.ua%2Fkorysna-informatsiia%2Fkorysni-materialy%2Fcategory%2F6-novyny-ta-baza-proektiv.html%3Fdatabase&usg=AFQjCNFSPC743tl6RWnNCB8oR3JX7ZTqiw&oc_el6X7ms0WsfwUw&bvm=bv.122852650,d.bGg)

[oc_el6X7ms0WsfwUw&bvm=bv.122852650,d.bGg](https://www.google.com.ua/url?sa=t&rct=j&q=&esrc=s&source=web&cd=11&cad=rja&uact=8&ved=0ahUKEwiV59Ct9ffMAhUECSwKHas-A8A4ChAWCBkAA&url=http%3A%2F%2Ferasmusplus.org.ua%2Fkorysna-informatsiia%2Fkorysni-materialy%2Fcategory%2F6-novyny-ta-baza-proektiv.html%3Fdatabase&usg=AFQjCNFSPC743tl6RWnNCB8oR3JX7ZTqiw&oc_el6X7ms0WsfwUw&bvm=bv.122852650,d.bGg)

<http://www.docfoc.com/mmateng-eu>

<http://kpi.ua/en/node/8985>

<http://intellect.compano.kpi.ua/profile/byi7/execution>

<http://kpi.ua/en/node/8723>

<http://iff.kpi.ua/en/the-international-office/international-projects>

<http://ela.kpi.ua/handle/123456789/47>

<http://compnano.kpi.ua/uk/zarubizhne-partnerstvo.html>

<http://forea.kpi.ua/wp-content/uploads/2016/03/FACULTY-OF-P>

http://foundry.kpi.ua/images/stories/conference/conferenziya_2/

<https://www.facebook.com/photo.php?fbid=2869968049725758>

<https://www.tempus.org.ua/uk/events.html>



4. Dissemination and Sustainability

- To achieve a multiplier effect of the project NTUU “KPI” involved new levels of participants:
 1. School level: professional orientation of schoolchildren in frame of the Minor Academy of Sciences of Ukraine.
 2. MESO office **provides the connection** in the fields of material engineering **between different stakeholders**: school (schoolchildren, teachers), universities (students, teachers, scientists), enterprises or organizations (employers, customers of scientific and educational products or services), National Academy of Sciences of Ukraine (teachers, scientists, employers).
- For continuation of the the achievements the joint using of the developed in project web platform, joint **development and submitting of new educational, scientific and infrastructural projects** are now carried out and planned in future.
- We plan to **develop the results of the project** in the future in the directions of **further modernization of curricula and educational tools for training and retraining of different stakeholders**, improving of the contacts with labor market and expansion of the cooperation with partners organizations in European Union and Partners Countries.

5. Publishing

1. Biriukovych L. O. Crystal chemistry of Refractory Compounds : study guide / L. O. Biriukovych. – Kyiv: Center of educational literature, 2017. – 112 p.
2. Stepanchuk A.M. Theory and technology of pressing powdered materials: study guide . – Kyiv: Center of educational literature, 2016. - 320 p.
3. Loboda P.I., Karasevs'ka O.P., Trosnikova I.Yu. X-Ray analysis of materials in disperse state. – Kyiv: Center of educational literature, 2016. – 150 p.
4. Stepanchuk A.M., Bilyk I.I. Materials for spraying: study guide. – Kyiv: Center of educational literature, 2016. – 249 p.
5. Proceeding of the International Scientific-Methodological Conference “Materials for Use in Extreme Conditions – 6” Supported by “MMATENG” Project Objectives, Kyiv, Ukraine, December 1-2, 2016. - Kyiv: Center of educational literature, 2017. – 412 p.



6. Additional joint activities between universities of consortium

➤ The activation of project activities on both Ukrainian and international level in the departments involved in MMATENG project.

So with universities partners in the project were submitted:

✓ 2 projects for academic mobility within the European program Erasmus + KA1 (KUL (in 2015 and in 2017) and ENSCL (in 2017));

✓ 2 projects on academic mobility in the framework of DAAD (TUB 2016);

✓ 3 projects under the European program Erasmus+ KA2 (DASPACE (2016), SPEED-UP and METAL (2017)).

➤ With the Ukrainian companies about 10 research contracts (Design bureau “Pivdenne”, “Mayak”, “Meridian”, etc.) have been signed.

6. Additional joint activities between universities of consortium

NTUU “KPI” and Faculty of Physical Engineering in particular **very strongly interested** in future widening of cooperation between of consortium participants

And we plan widening of contacts for submitting of new educational and scientific projects in frame of EU (or other) programs.





Welcome to Ukraine

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