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Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs / EduEnvi

Webinar on EduEnvi piloting results

31.03.2020

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Al-Farabi Kazakh National University

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Enhancing Competences of Sustainable Waste Management in Russian and Kazakh HEIs / EduEnvi

10/15/2017 – 10/14/2020

The main goal of the project is to modernize, improve accessibility and internationalize higher education in the field of physical sciences and environmental protection in Kazakhstan and Russia

PARTNER UNIVERSITIES

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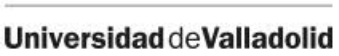
University of Applied Sciences Tampere, TAMK, Finland

Academy Lillebaelt (University of Applied Sciences), Denmark

Valladolid University, Spain



ITMO University, Russia

Ural Federal University (UrFU), Russia

Tyumen State University, Russia

Al-Farabi Kazakh National University, Kazakhstan

Sh. Ualikhanov Kokshetau State University, Kazakhstan

M.Auezov South Kazakhstan State university, Kazakhstan

PILOTING

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1. ensuring the correct functioning of the planned online training modules for sustainable waste management to develop recommendations for effective training. To use the results of the project, online courses will be tested on the platforms ifmo.courses.ru (Russia) and open.kaznu.kz (Kazakhstan) by students from all participating universities

2. to promote the dissemination of project results, to inform other universities, local and national authorities and other interested parties about the availability and relevance of the developed modules.

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MODULES

1. Complex risk assessment of waste disposal
2. Biotechnologies for waste utilization
3. Non-energy technologies for waste utilization
4. Energy technologies for waste utilization
5. Development of business and entrepreneurship for sustainable waste management
6. Public administration and municipal governance in Sustainable Waste management
7. Environmental management and waste prevention
8. Life cycle analysis and life cycle costing

COURSES

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Name of modules	Courses
Module 1 **Complex risk assessment of waste management**	Introduction to environmental risks – 3 ECTS, KokSU
	Environmental, social and economic risks /(ERA) - 3 ECTS, TumSU
	Solid waste and environmental risks - 3 ECTS, TumSU
Module 2 **Biotechnologies for waste utilization**	Basics of ecological biotechnologies - 3 ECTS, SkSU
	BATs of waste utilization by biological methods - 3 ECTS, ITMO
Module 3 **Non-energy technologies for waste utilization**	Basics of waste utilization - 3 ECTS, KazNU
	Reuse of side products and outputs - 3 ECTS, KazNU
	Physical-chemical treatment methods in waste management - 3 ECTS, KazNU
Module 4 **Energy technologies for waste utilization**	Waste-to-energy plants and technologies - 3 ECTS, KazNU
	Energy efficient technologies in waste treatment - 3 ECTS, KazNU

COURSES

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Name of modules	Courses
Module 5 Development of business and entrepreneurship for sustainable waste management	Modeling of business processes in the field of waste management – 3 ECTS, ITMO
	Business planning for sustainable waste management projects – 3 ECTS, ITMO
Module 6 Public administration and municipal governance in Sustainable Waste Management	Institutional approach to SWM decision-making – 3 ECTS, UrFU
	Public and municipal governance in SWM – 3 ECTS, UrFU
	Budget and financial base of SWM – 3 ECTS, UrFU
Module 7 Environmental management and waste prevention	Theory and practice of waste management in companies – 3 ECTS, ITMO
	Waste prevention – 3 ECTS, ITMO
	Modelling of dispersion and diffusion of pollutants – 3 ECTS, ITMO
Module 8 Life cycle analysis and life cycle costing	Introduction to LCA based on ISO 14040 series – 3 ECTS, TumSU
	Application of LCA and ISO 14001 for waste management – 3 ECTS, ITMO

PLATFORMS

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Open Education National Platform of Kazakhstan - http://moocs.kz/

Open online courses - http://open.kaznu.kz/

ITMO courses - Open Online Learning - https://open.ifmo.ru/

http://moocs.kz

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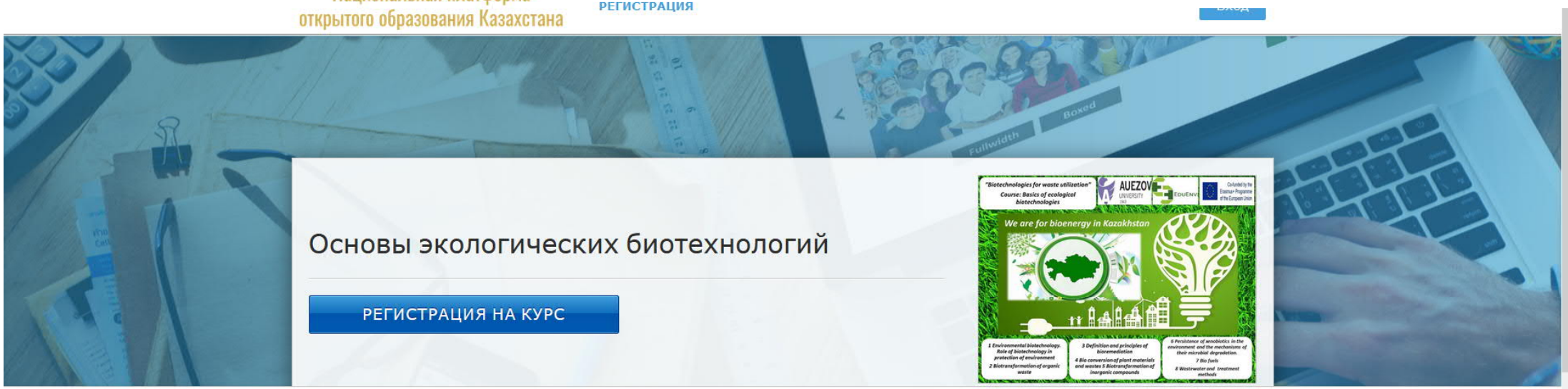

О КУРСЕ

Данный курс посвящен возможностям биотехнологии, позволяющим улучшать экологическую обстановку и поддерживать устойчивое равновесие в системе «природа – человек» с использованием ресурсосберегающих, экологически безопасных технологий, ориентированных на комплексную переработку отходов в Казахстане и России. Курс читается на русском языке, в каждом видео есть казахские и английские субтитры. В первую очередь курс будет интересен магистрантам, студентам, интересующимся современными возможностями улучшения экологического состояния, преподавателям ВУЗов для наращивания потенциала в новейших европейских педагогических подходах, сотрудникам

ЮКГУ им. М.Ауэзова

Начало курса **дек. 24, 2019**

Конец курса **янв. 22, 2020**

http://moocs.kz

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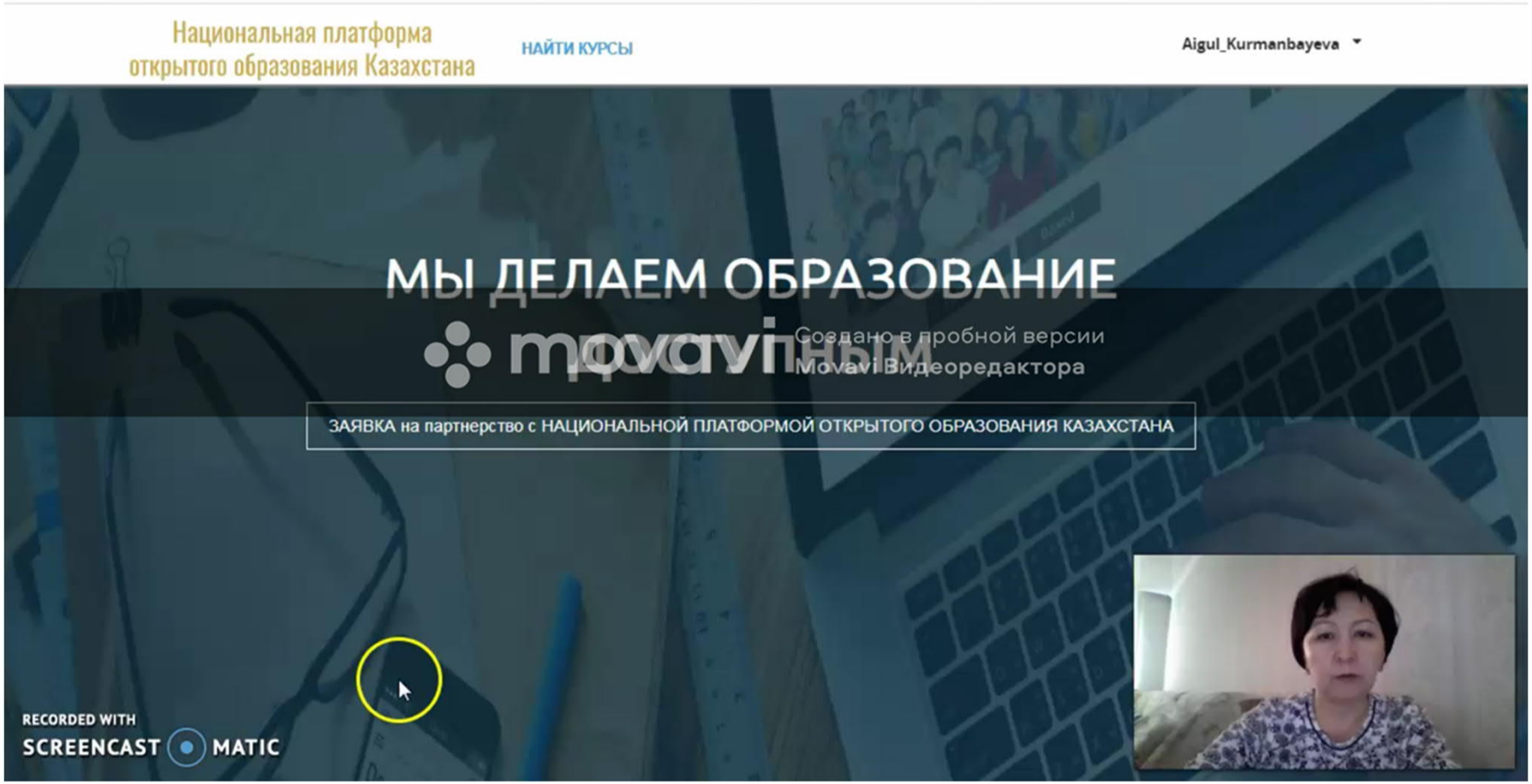

http://open.kaznu.kz

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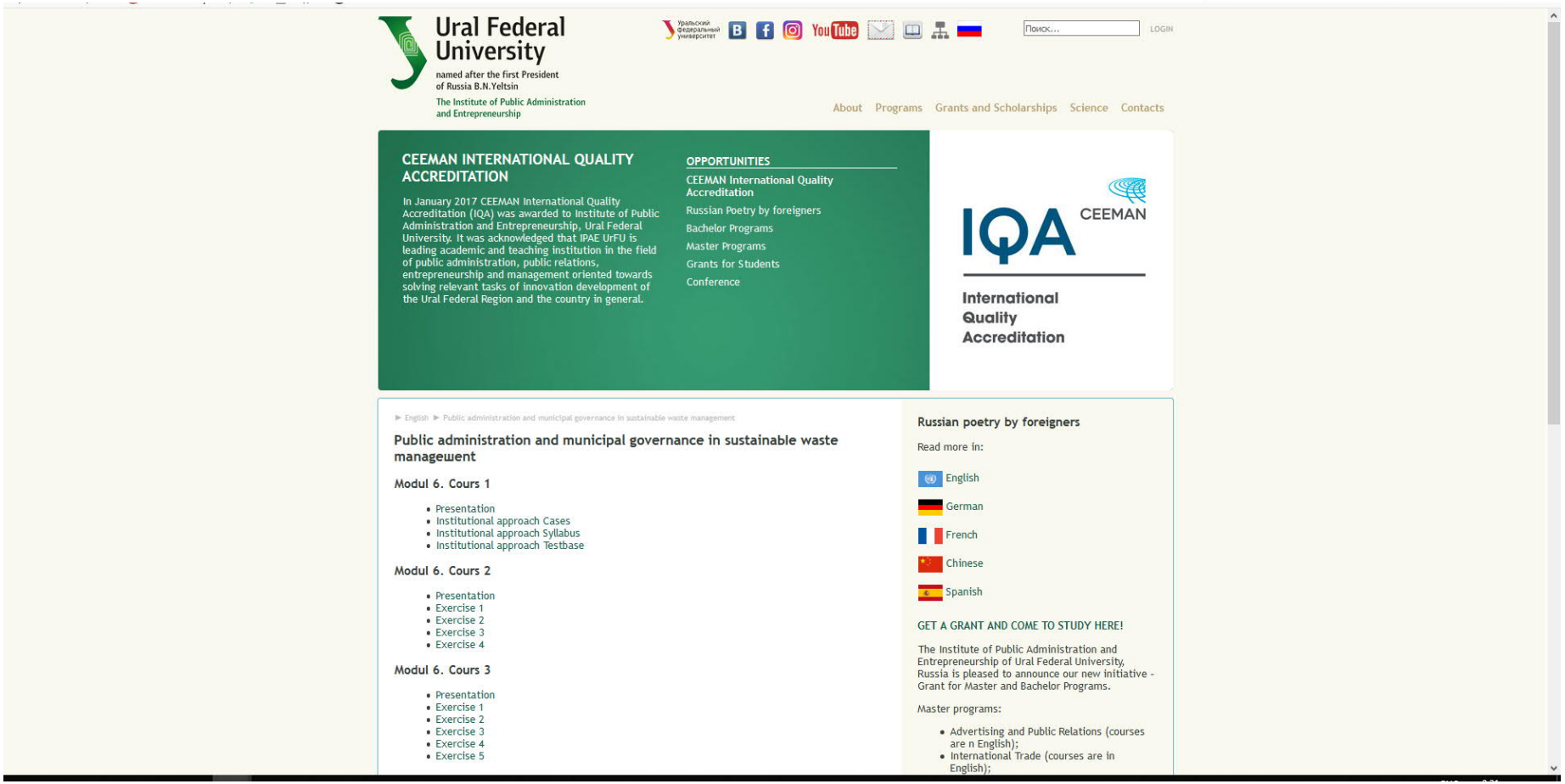
http://igup-old.urfu.ru/article/archive/3764/



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https://stepik.org/course/66228/promo#toc

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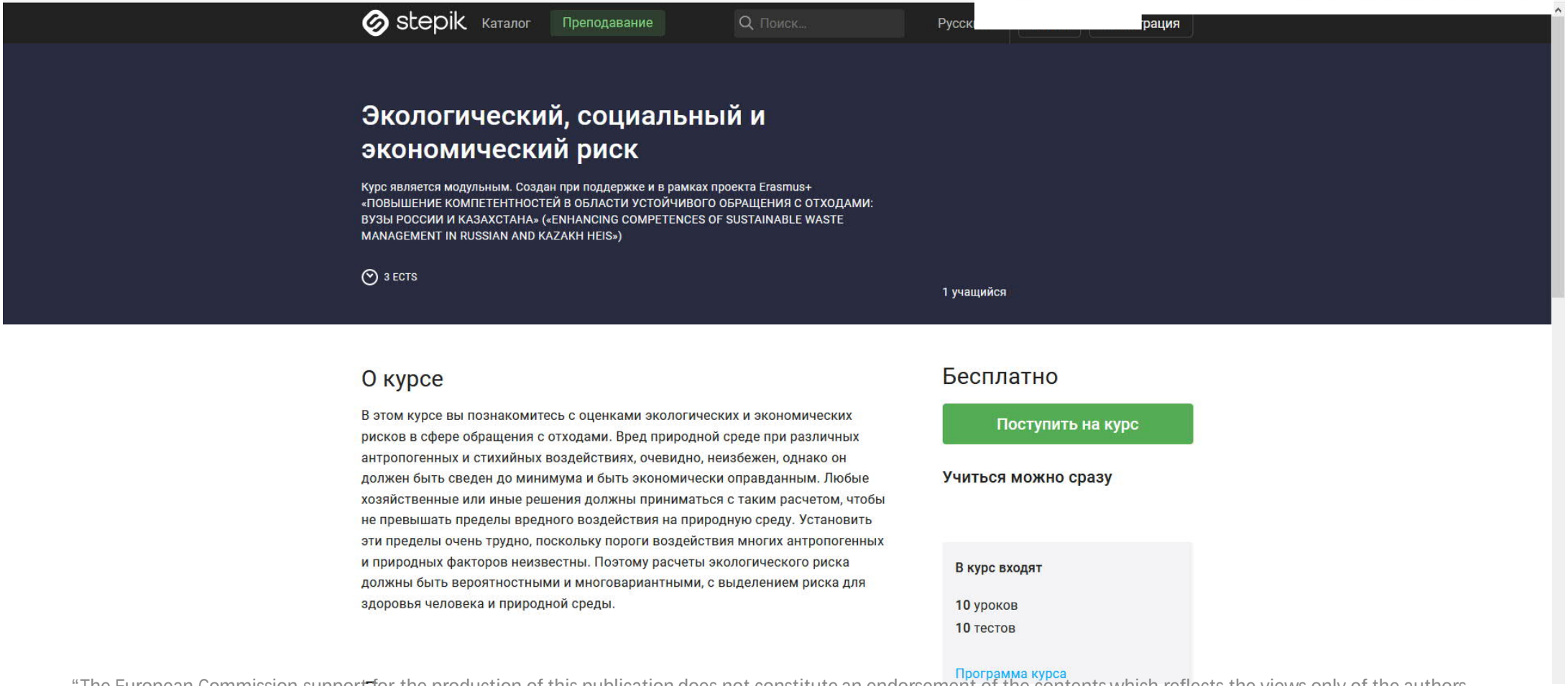

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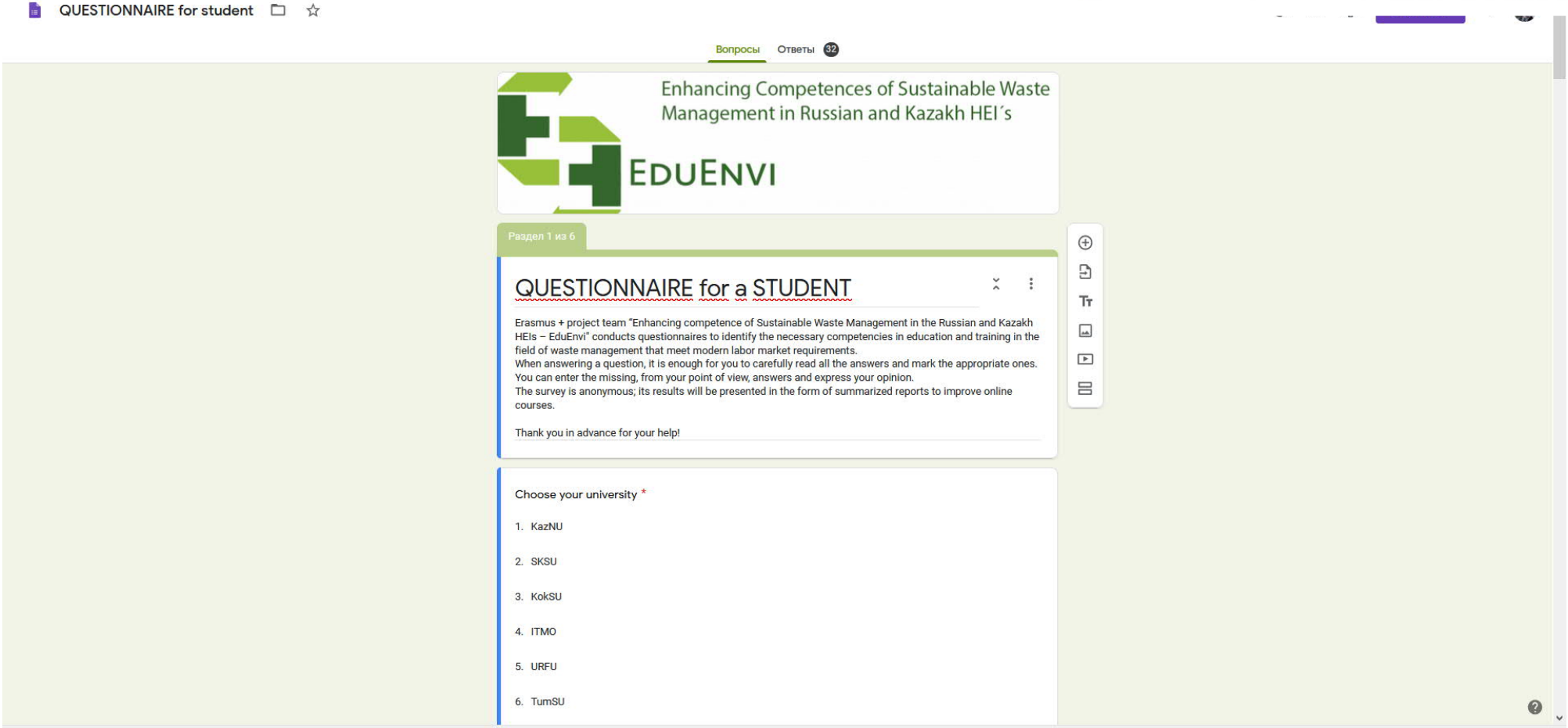

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	Yes	For the most part	Somewhat	No
THE PURPOSE OF THE COURSE:				
necessary to work in the chosen specialty	o	o	o	o
necessary for use in a new profession	o	o	o	o
for own development	o	o	o	o
Your response options				
COURSE CONTENT				
The lecture material is clear, set out available	o	o	o	o
During training, foreign experience was actively considered	o	o	o	o
Course materials were complex	o	o	o	o
Course files of various formats (video, audio, presentations, etc.) are available for download and viewing	o	o	o	o
Requirements for the implementation of practical tasks are clearly formulated	o	o	o	o
Practical assignments were difficult	o	o	o	o
EVALUATION OF THE ASSIGNMENTS				
Are the criteria for evaluating the work performed clearly defined?	o	o	o	o
Are different assessment methods used (self-assessment, group assessment, testing, teacher assessment, etc.)?	o	o	o	o
Exposed grade was objective	o	o	o	o
FEEDBACK				
The learning outcomes correspond to your expectations	o	o	o	o
The course was helpful for you	o	o	o	o
Would you recommend this course to a fellow student?	o	o	o	o

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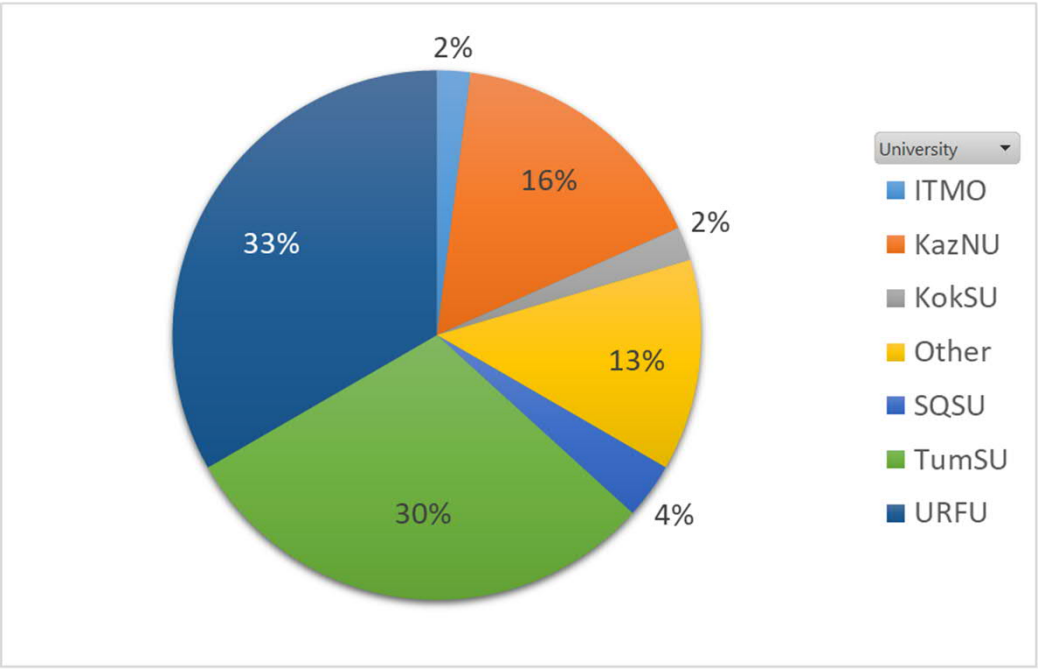

147 students

Necessary to work in the chosen specialty – 66 %

Necessary for use in a new profession – 54 %

Necessary for own development – 73 %

The learning outcomes correspond to your expectations – 76 %

The course was helpful for you – 78 %

Would you recommend this course to a fellow student? – 74 %

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Comments of students

№	University	What did you like best about the course?	What did you like least about the course?	How can the course be improved? What changes would you recommend to improve this course?
1.	ITMO	I like practice work and visit different companies in frame of this course	The schedule (It was difficult to match with another courses)	Everything was nice! Thank you!
2.	ITMO	Useful, sensibilisation, learn some automatism	Maybe not enough practice	
3.	KazNU	the course is clear interesting material	some slides have a lot of text	Overall, the course is well prepared. It would be nice if information on waste management companies in the Republic of Kazakhstan was contained
4.	KazNU	The clarity and simplicity of the course assignments	All liked it	add more visual materials
5.	KazNU	everything was fine	All liked it	Recommendation is not
6.	KazNU	Course materials are easy-to-read and easy to perform tasks	All liked it	add interesting interview
7.	KazNU	The information was mainly provided for the country where I live, but there were also foreign comparisons	briefness	More videos
8.	KazNU	the course was understandable, the tasks were simple	I liked everything	More video materilas
9.	KazNU	the course is clear, the tasks are simple, can be performed at a convenient time	There are few visual materials in lecture 8	I have no suggestions
10.	KazNU	Everything	nothing	I do not know
11.	KazNU	Understandability of materials!	I liked everything	I do not know
12.	KazNU	Colorful presentations	A lot of information	no
13.	KazNU	The course was accessible	no	add more animation
17.	KazNU	Interesting course		
18.	KazNU	I liked everything		
19.	KazNU	Submission of information in audio and visual format	Everything is fine	Supplement with examples of world experience
20.	KazNU	Quality of information		
21.	KazNU	Everything		
22.	KokSU	The development of critical thinking	Few live communication	Include more tests
23.	KokSU	video	everything suits me	no
24.	KokSU	Availability and simplicity of the information presented	nothing	Everything is fine
25.	Other	Everything	In principle, a good course everything is clear	additional material could be introduced
26.	Other	Everything is OK	there wasn't it	additional infrmation could be introduced
27.	Other	Everything	there wasn't it	additional information could be introduced; the course is easy to understand
28.	Other	Everything	nothing	no
29.	Other	Everything	I liked everything	
30.	Other	I liked the selection and presentation of the material. Concisely, diverse material, covering all areas of science and practice.	nothing	Recommendation is not
31.	Other	the selection and presentation of the material	nothing	Recommendation is not
32.	Other	Everything	nothing	Recommendation is not
33.	Other	Everything	nothing	no
34.	Other	clarity		All is enough
35.	Other	Everything	nothing	
36.	Other	clarity, thoughtfulness	Interesting materials	More tests
37.	Other	clarity, thoughtfulness	Interesting materials	More tests
38.	Other	Everything		Everything is fine
39.	Other	clarity		Everything is fine
40.	other	practical tasks		

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What did you like best about the course?
many interesting examples,
non-standard presentation,
the use of different formats in training,
the use of multimedia technology,
available material, visibility,
concrete examples from life and the ability to put the acquired knowledge into practice,
quality of information,
the development of critical thinking,
Information on waste management in other countries,
relevance,
I can apply in my future profession

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What did you like least about the course?
difficult course, requires special knowledge
Difficult english
Technical problems (Eliademy doesn't work-TumSU)
Maybe not enough practice
some slides have a lot of text
it's unusual to study online
complicated terminology

How can the course be improved?
What changes would you recommend to improve this course?
more universal
Make language easier
Need more time
Introduce special programs for calculating the product life cycle into the course
One or two excursions to the objects
improve the site design itself,
troubleshoot job loading failures,
use another platform

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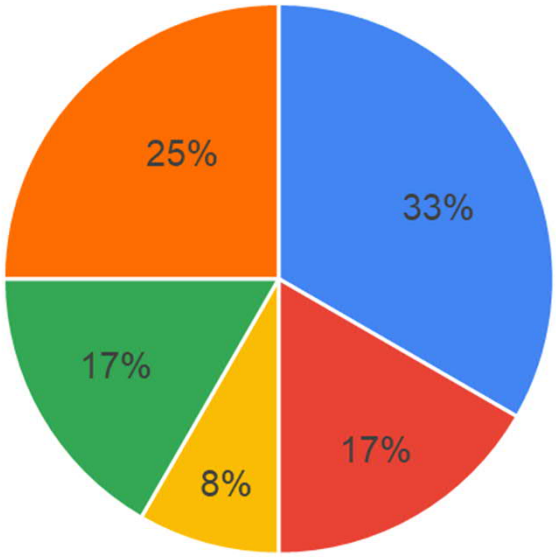
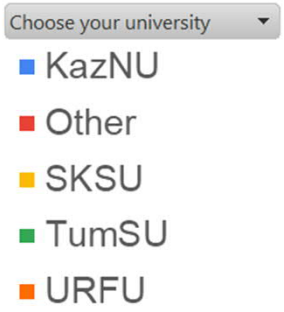




12 teachers

The student's previous training is taken into consideration – 58%

Course content is relevant – 92 %

The declared learning outcomes correspond to the competencies – 92 %

The course is adapted to the specifics and needs of students–100%

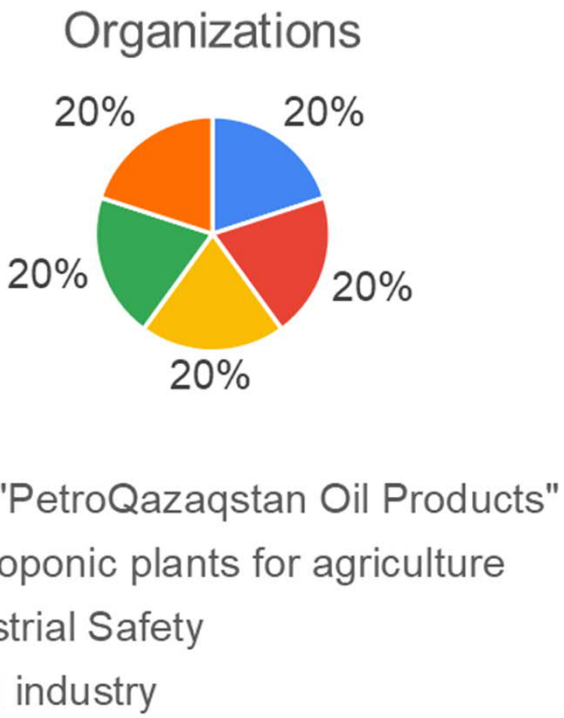
Links to used sources are indicated – 92 %

Are there materials of various formats (video, presentations, audio, text files, etc.) – 83 %

Is there a connection between practical tasks and real processes of production activity? – 75 %

Comments - teachers

№	University	What, in your opinion, are the strengths of the course?	What, in your opinion, are the weaknesses of the course?	How can the course be improved? What changes would you recommend to improve this course?	What problems did you encounter while developing and recording the course?
1.	KazNU	The course is beautifully designed, and is effective for both the student and the teacher.	Not noticed	You can also collect more information	
2.	KazNU	The material of the course is of interest and invigorates	You should not expect it	More video materials	technical problem is not I was worried when I voiced the course to the camera
3.	Other	It raised a global issue.		add lab work	
4.	Other	Topical issues of environmental issues are considered.	no	Improve the experimental part	no
5.	SKSU	This course is basic, fundamental, which will help students of various specialties and professions better understand the basics of environmental biotechnology and be prepared for the next course, which affects environmental biotechnology from an applied point of view	It is difficult to answer this question. But I think the main drawback of the course is that this format for constructing courses is completely new for Kazakhstani universities, which means that the presentation of materials may not be at a high	Closer work with stakeholders	Lack of competency to develop MOOCs
			need to be finalized, more training video is needed		
7.	TumSU	Relevance materials	Features of the Eliademy Platform	Add foreign experience in waste disposal and reclamation	Work with the Eliademy platform
8.	URFU	The specific features, involving SWM	The lack of specific features, involving SWM	To make it more SWM oriented	none
9.	URFU	Practical orientation. Using the best foreign practices.	Difficulty finding information	It is necessary to continue testing the course in order to identify ways to improve.	I had to spend a lot of time searching for relevant information.



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4 company employees

Necessary to work in the current position – 50 %

Is the course aimed at solving real industry problems? – 50 %

The theme of the course is modern and relevant – 50 %

Do practical tasks relate to everyday life? – 50 %

Learned/mastered new ideas, techniques, approaches – 50 %

The course allowed to increase professional competence – 50 %

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Comments – company employee

№	University	What, in your opinion, are the strengths of the course?	What, in your opinion, are the weaknesses of the course?	How can the course be improved? What changes would you recommend to improve this course?
1.	KMU	Understandably A lot of information	In the Republic of Kazakhstan, this area is not sufficiently developed	Need to supplement with multimedia data
2.	LLP "PetroQazaqstan Oil Products"	These materials are relevant	A sufficient number of practical works It will be useful to include a large number of practical tasks	I recommend the inclusion of a virtual lab
3.	Hydroponic plants for agriculture	It's better to introduce a different course, which is important for the state	A feeling as if the course wrote on his knees	Replace people who were preparing the course
4.	Industrial Safety	The stages of environmental biotechnology are clearly articulated	I think there is no such	More videolessons with living examples
5.	Food industry	The brevity, accuracy of the problems and their solutions		

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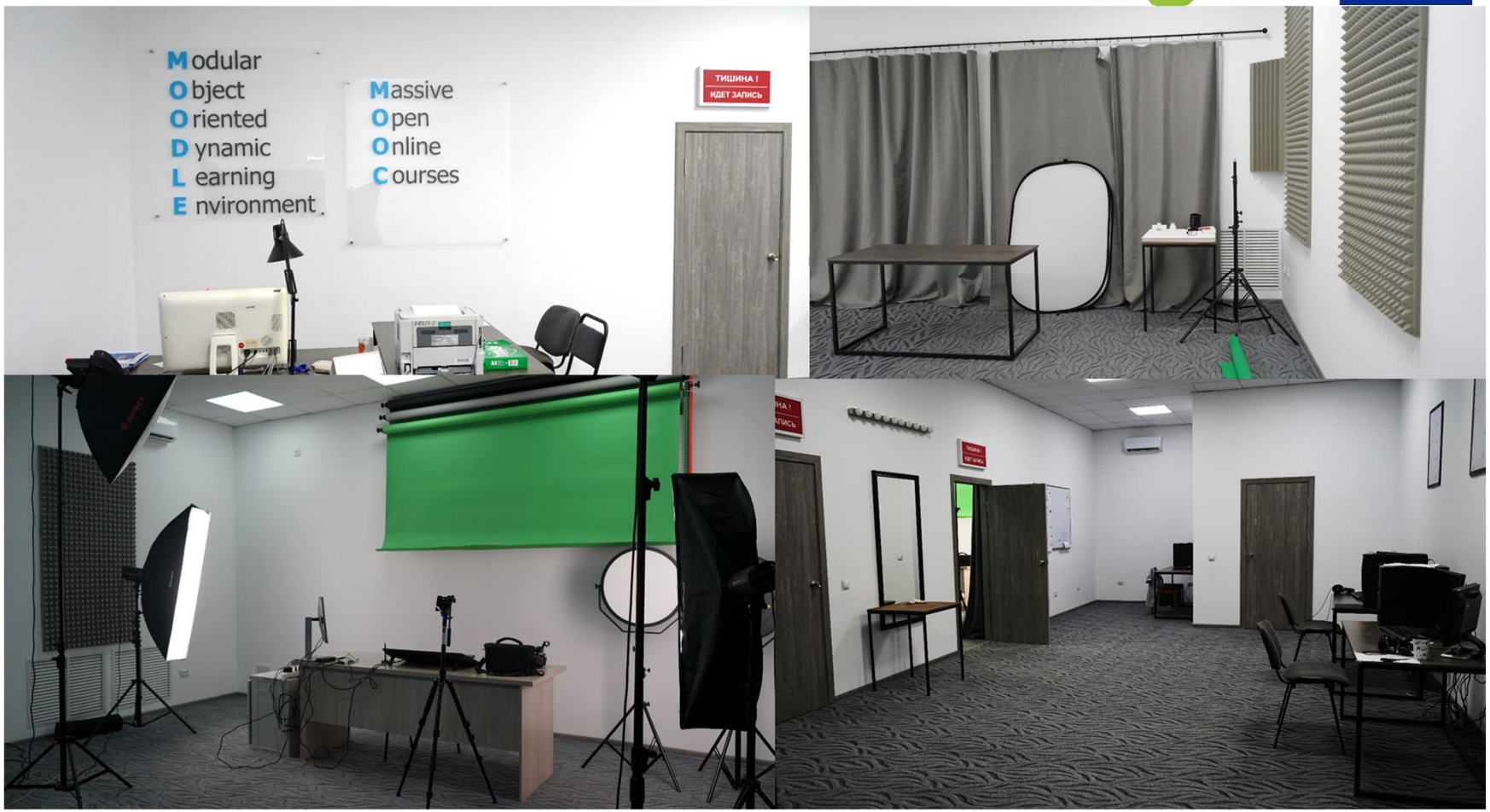

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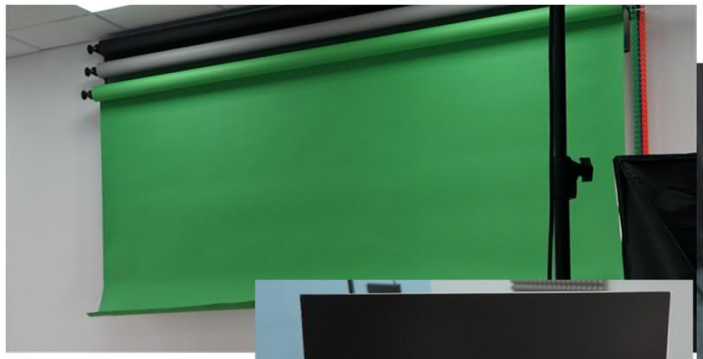

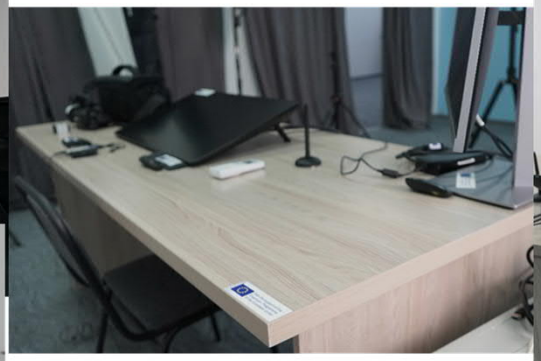

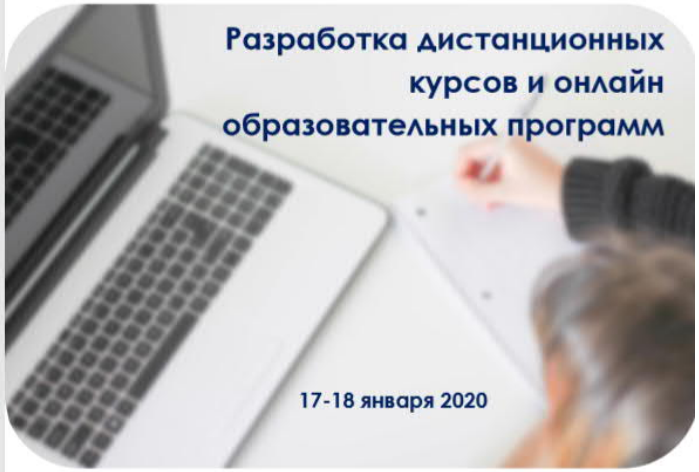

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Утвержден
приказом Министра образования и наук
Республики Казахста
от 22 января 2016 года № 61

Приложение
к приказу Министра образования и науки
Республики Казахстан
от «__» _____ 2019 года

Правила обучения в форме экстерната и онлайн-обучения

Глава 1. Общие положения

1. Настоящие Правила организации учебного процесса в форме онлайн обучения (далее – Правила) разработаны в соответствии с подпунктом 46-10) статьи 5 Закона Республики Казахстан от 27 июля 2007 года «Об образовании» и определяют порядок обучения в форме экстерната и онлайн обучения.

2. Организация учебного процесса в форме онлайн обучения осуществляется для освоения обучающимися образовательных программ в соответствии с академическим календарем ВУЗа.

3. Реализация онлайн обучения осуществляется посредством цифровых технологий и телекоммуникационных средств.

4. Нормы времени по видам учебной работы при планировании и организации учебного процесса в онлайн обучении устанавливаются организациями образования самостоятельно. При этом необходимо определить функциональные обязанности тьютора и разработчика цифрового контента.

5. Онлайн-обучение может осуществляться организациями образования, имеющими лицензию на образовательную деятельность, при наличии:

- веб-платформы и серверной инфраструктуры (собственной или на правах аренды) для онлайн-обучения;
- доменное имя третьего уровня edu.kz для организации образования;
- материально-технических условий для реализации онлайн-обучения (рабочие места для сотрудников, студия для записи видео и аудио контента,

Проект

РЕКОМЕНДАЦИИ
по итогам семинара-тренинга по разработке дистанционных курсов и онлайн образовательных программ

17-18 января 2020 года **г. Алматы, Университет международного бизнеса**

Министерству образования и науки РК:

1. Внести изменения в «Правила организации учебного процесса по дистанционным образовательным технологиям»:

1) пункт 16 изложить в следующей редакции:

п. 16 «При оценке результатов обучения организация обеспечивает идентификацию личности обучающегося. Выбор способа идентификации и контроль соблюдения условий проведения мероприятий по оценке результатов обучения осуществляется организацией самостоятельно».

2. Рассмотреть возможность внесения изменения в Закон РК «Об образовании» о ~~внедрении~~ введении дистанционной или онлайн формы образования вместо заочного обучения??(может убрать?);

3. Совместно с Министерством юстиции рассмотреть возможность придания официального статуса («де-юре») свободным лицензиям Creative Commons для защиты авторских прав и развития открытых образовательных ресурсов через посредством внесения изменений в Гражданский кодекс;

4. Рассмотреть возможность финансовой поддержки вузов, участвующих в международных рейтингах (QS, THE University Rankings), для публикации МООК ~~в~~ на известных платформах онлайн образования (Coursera, edX, и т.д.), ~~в целях~~ для повышения привлекательности высшего и послевузовского образования и позиционирования казахстанских вузов на международном образовательном пространстве.

Высшим учебным заведениям:

1. Усилить Провести работу по подключению всех обучающихся и

Feedback on the course development	Aygul Kurmanbaeva (UU)	Madina Dzhakasheva (SKSU)	Madina Mamedova (KazNU)	Alexander Yashin (URFU)	Alibek Zhakupov (KazNU)
What points in the development of the courses you need to pay attention? На какие моменты при разработке курсов нужно обратить внимание?			From my point of view, every stage of the course development was important to pay attention. However, I want to outline that collection of the course materials and making a video lectures needs a special attention.	Мне кажется, эффективней всего было бы в начале разработать единую форму, или, если угодно, шаблон представления материалов курса – лекций, презентаций, видеоматериалов и прочего	Трудности в оформлении своих презентаций, необходим общий шаблон презентаций для всех курсов. Также считаю, что программа для создания презентаций и программа для монтажа видео лекций должны быть едины для всех
What help did you need at all stages of the course development? Какая помощь была Вам нужна на всех этапах разработки курса?	Техническая поддержка (отсутствие студии записи) Хотелось записать студийную видео-лекцию, но пока не имеем технических возможностей. Поэтому лекции презентационные.	Запись видео лекций занимает продолжительное время с учетом монтажа. В ВУЗе имеется всего 2 специалиста, что тоже ограничивает во времени	It was helpful to use a help of subject expert he was the main source of information. Expert helped me to clearly formulate the learning objectives and select the necessary materials, as well as provide valuable advice and comments.	Каждый курс – авторский и творческий, так что помощь нужна скорее методическая, см. ответ на первый вопрос	познавательно проработать дизайн презентаций
What stages have caused you difficulty? Какие этапы вызвали затруднения у Вас?	Разработка практических заданий. Сложные задания могут отпугнуть слушателей. Ориентировалась на своих магистрантов, просила их выполнить подобные задания и затем проводила опрос. Сложно ли им было выполнять? Сколько времени они потратили на выполнение заданий	Недостаточность навыков работы с электронными инструментами	The stage of creating a script for the course was difficult for me, since it is the main and integral part of it. Without a logically worked out scenario, inconsistencies, wasted time and one-sided reflection of the topic were a problem.	Больше всего – этап сбора исходного материала, на него было потрачено в три раза больше времени, чем планировалось в начале. Обнаружилось, что по моему курсу материала крайне мало или он вовсе отсутствует по некоторым разделам	Терминология по переработке в каждой стране различна и необходимо выбрать максимально обобщенную терминологию и классификацию
Was support from our foreign partners helpful? Была ли полезной поддержка со стороны наших зарубежных / отечественных партнёров?	Встречи с работодателями. Говорила с ними много. При подготовке лекций ориентировалась на их опыт и советы		Support from our foreign partners was very helpful, especially the workshop that was carried out in Finland. The learning e-tools that I have used in this course I was introduced to there.	Было очень полезно обсуждение в Вальядолиде	Обсуждение онлайн – курсов с преподавателями, имеющими хороший опыт ведения лекций. Своеобразный фильтр - дорабатывался дизайн лекций и подача некоторых материалов

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15	Theory and Techniques of A Scientific Experiment	The main purpose of the discipline: the study of the foundations of modern theory of engineering experiment methods of planning, im ematical processing of experimental data and analysis of the results of an active experiment During the study of course, students should be competent to: 1. select the object of study; 2. carry out mathematical planning of the experiment; 3. independently carry out experimental studies in laboratory and industrial conditions 4. produce a statistical analysis of experimental data; 5. use the methods of statistical processing of the results of an engineering experiment. During the study of the discipline students will learn following aspects: The main tasks of research work. General characteristic of the research object. Simulation and similarity. Fundamentals of mathematical design of the experiment. Statistical analysis of experimental data. Analysis of experimental results. Fundamentals of the theory of random processes and their statistical processing. Computer methods of statistical processing of the results of an engineering experiment	PD	UC	5
16	3D Simulation of Reacting Flows in Combustion Chambers	The main purpose of the discipline: the study of methods and features and the formation of skills of three-dimensional modeling of reacting currents in areas of real geometry when burning energy fuels. During the study of course, students should be competent to: 1. build mathematical models describing the processes of convective heat and mass transfer in reacting media in areas of real geometry; 2. apply the method of control volume to obtain finite-difference equations; 3. simulate the chemical reactions that occur during the combustion of fuels of complex composition; 4. conduct a numerical study of heat and mass transfer processes in turbulent reacting flows; 5. analyze the data obtained as a result of computational experiments. During the study of the discipline students will learn following aspects: Basic equations and method of solving three-dimensional simulation of convective heat and mass transfer in reacting media in the areas of real geometry. Two-phase flow. Heat transfer by radiation. Obtaining differential equations of metadatastandardname. Optimal modeling of combustion of pulverized coal on the sample of GRES. The problem of reducing the release of nitrogen oxides NOx.	PD	EC	5
17	Automated Control Systems of Thermo-Technical Processes and Attitudes	The main purpose of the discipline: study of the general principles of the automated control industry, the study of automated control systems of boiler units, water treatment equipment and fuel, heating units, utilities, dryers and refrigeration units, chemical and metallurgical industries. principles of management thermal engineering by industry, functions and tasks of automated control systems, alarm and protection of specific industrial installations; acquaintance with the basic modern trends in the field of automated management systems for industrial facilities. During the study of course, students should be competent to: 1. understand the ways of regulating the main and auxiliary equipment of TPPs; demonstrate knowledge and understanding of automated control at thermal power plants; 2. classify automated control systems of heat engineering processes and installations; 3. analyze the schemes of regulation of technological processes; 4. apply the knowledge gained to the algorithmic description of typical tasks of process control; 5. based on the knowledge obtained in the study of this discipline, to make independent decisions when solving various practical tasks During the study of the discipline students will learn following aspects: Basic concepts, terminology and definitions, billing systems and process control systems. Differential equations and dynamic characteristics of linear systems. Elementary dynamic units and their connections. Technical means of automation, technical structure billing system. Regulators and controllers. Information about regulatory bodies and enforcement mechanisms. Scheme of automation of heat engineering processes and installations.	PD	EC	5
18	Computer Modeling of the Comustion of Liquid and Solid Fuels	The main purpose of the discipline: formation at students of knowledge, skills of application of methods of modeling and optimization of heat power processes, installations and systems of thermal power plants and the industrial enterprises. During the study of course, students should be competent to: 1. apply modern computer technology when conducting research; 2. analyze and apply modern methods of effective organization of combustion processes in industry; 3. use professional knowledge and acquired skills to solve technical problems; 4. develop and propose ways to optimize plants and systems of power system; 5. carry out mathematical modeling in order to study the processes of heat and mass transfer during the combustion of liquid and solid energetic fuels. During the study of the discipline students will learn following aspects: Methods and methods of analog, physical and mathematical modeling. Mathematical modeling of processes, devices and systems power system, optimization of options of installations and systems of power system. Methods and methods of development of mathematical models for warmly technological processes, installations and systems. Numerical methods of calculation of the main characteristics of heat carriers, warm and mass-exchanged devices. Methods of optimization of warmly technological installations and methods of calculation of optimum heat power systems. Application of methods of modeling at research and design of warm technological systems and their elements	PD	EC	5
19	Problems of Waste Production and Their Solution	The main purpose of the discipline: study of the conditions for increasing the efficiency of waste-free production; learning the methodology of complex assessment of natural-economic areas that host production, estimation of influence of natural economic territories in the security industries During the study of course, students should be competent to: 1. form a complete understanding of the methods of energy and resource-saving technologies; 2. analyze the processes of electrothermochemical preparation of coal for combustion and its combustion in the furnace of the power boiler; 3. use domestic and foreign experience in developing waste-free production in the energy sector of the Republic of Kazakhstan; 4. critically evaluate and develop new methods for solving the problems of waste-free heat and power engineering and heat technology; 5. systematize knowledge of the current state of development of waste-free production and ways to solve emerging problems. During the study of the discipline students will learn following aspects: Classification of waste. The characteristics of the waste fuel. Coal mining waste, fly ash CHP, ashes, wastes of oil production and ways of their transportation and processing. Methods of waste-free processing of waste and energy used as reducing agents. The basics of creating a waste-free production processes and requirements. Rational use of waste. Reclamation of quarries raw materials. Optimize production of a target product from waste	PD	EC	5
		The main purpose of the discipline: studying of methods and rules of design of systems of power supply of the cities and industrial enterprises; development of modern methods of calculation of normal and emergency operation of work of the electric networks focused on power - and resource-saving. During the study of course, students should be competent to: 1. determine the design electrical loads and choose			

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Necessary components for the development of courses:

1. A sufficient margin of time;
2. Discussion of the content and structure of courses, presentation design with experienced colleagues and employers;
3. Good skills in electronic tools;
4. The inclusion of multimedia materials - video, interviews;
5. Development of tasks on the example of practical materials;
6. Feedback;
7. Technical equipment;
8. Assistance from technical personnel - as a rule, the staff of such departments is small...

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THANK YOU FOR ATTENTION!