

**Periodical Report  
24 Months of project  
implementation**

**New and Innovative Courses  
for Precision Agriculture**

**KOZYBAYEV  
UNIVERSITY**



**NICOPA**

**M.KOZYBAYEV NORTH  
KAZAKHSTAN UNIVERSITY**

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**Joint Project: Capacity Building in the  
Field of Higher Education ERASMUS+  
2018**

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# Table 1.1. ACTIVITIES IMPLEMENTED

**1 Question.** Please, name activities and short description of their deliverables your university implemented so far according to the project work plan.

**Answer:**

1. On July 14, 2020, a meeting was held with representatives of JSC "Kirov Plant" (Petropavlovsk). This company is a potential employer for graduates of the Department of "Energy and Radio Electronics". At the meeting, the staff of the department presented materials on the goals, tasks and stages of the ERASMUS+ NICOPA project. Issues of employment of graduates and opportunities for further cooperation were discussed.

Employers have shown interest in existing bachelor's and master's degree programs.

## Table 1.1. ACTIVITIES IMPLEMENTED

2. At the beginning of October of this academic year (October 5), a meeting was held with leading specialists of GEOSCAN-KAZAKHSTAN LLP. This organization is the leader in the market of the Republic of Kazakhstan in the implementation of services and products related to unmanned aerial systems. At the meeting employees of the organization were presented materials of the project ERASMUS+ NICOPA, stages of modernization of educational programs "Astronomy and remote sensing techniques", and for University employees the latest technical and hardware solutions in the field of application and interpretation of unmanned aerial systems. The management of the organization showed interest in future graduates who are trained according to the presented educational program.

As a result of the meeting, the company's representative office proposed to implement a cluster for processing remote sensing data on the basis of the North Kazakhstan University, using existing workstations and purchasing a counting server in early 2021.

## Table 1.1. ACTIVITIES IMPLEMENTED

**2 Question.** Describe positive changes/benefits in your university as the result of each of the implemented activities of the project

**Answer:**

1. There is an increase in cooperation with employers in terms of general consultations on the expected results of training in demand specialists. As a result of the meeting, the parties developed a common view on the concept of training technical specialists for regional enterprises in the context of industrial development of the region and new opportunities for higher education. Representatives of the university received useful information about open vacancies and expected trends in demand for graduates of target departments.

2.2. The main part of the cluster has been assembled, test calculations have been performed, and a server station is expected to be purchased and connected.

# Table 1.1. ACTIVITIES IMPLEMENTED

**3 Question.** Describe any problems/difficulties encountered while implementing the activities and the measures taken to solve them

**Answer:**

1. At this point in the implementation of the project, the delivery of equipment has not been completed. The university has completed all the necessary measures for its implementation.
2. The main problem is the emergence of a meeting organization, because the country has a quarantine regime that imposes a strict framework for carrying out such events.

# Table 2.1.1. UPDATED COURSES

Table 2.1.1. UPDATED COURSES

Course №	Title of the course and in which program it is taught (Bachelor, Master, 5 years system for TM)	Its volume (in ECTS, hours for TM in case no ECTS)	Number of students participating in the courses	Name new elements in the course and estimate their percentage in relation to the preexisting course	Link to the course on the university page	Accreditation and recognition: Specify the date when the course was accredited in the curriculum and when the pilot teaching started
Course 1	Датчики технологических процессов, бакалавриат, 6B07106 Робототехническая, интеллектуальные системы и приборостроение	5	5	Параметрические преобразователи, 50%	<a href="http://is.nkzu.kz/e-library/">http://is.nkzu.kz/e-library/</a>	Совет факультета инженерии и цифровых технологий, протокол № 10, 23.06.2020. Пилотное обучение – 01.09.2020
Course 2	Интеллектуальные измерительные системы, бакалавриат, 6B07106 Робототехническая, интеллектуальные системы и приборостроение	5	4	Обработка измерительной информации в интеллектуальных ИИС, 33%	<a href="http://is.nkzu.kz/e-library/">http://is.nkzu.kz/e-library/</a>	Совет факультета инженерии и цифровых технологий, протокол № 10, 23.06.2020. Пилотное обучение – 01.09.2020
Course 3	Элементы искусственного интеллекта в технических системах, магистратура, 7M06201 – Радиотехника, электроника и телекоммуникации	5	2	Обучение на размеченных данных в технических системах, 33%	<a href="http://is.nkzu.kz/e-library/">http://is.nkzu.kz/e-library/</a>	Совет факультета инженерии и цифровых технологий, протокол № 10, 23.06.2020. Пилотное обучение – 01.09.2020
Course 4	Системы точного земледелия 6B08101 – АГРОНОМИЯ	6	14	Курс был поделен на 4 модуля. В каждый модуль были определены сроки посылки темы. Курс был обновлен на 30%. и	<a href="http://is.nkzu.kz/e-library/getf.asp?fid=55864">http://is.nkzu.kz/e-library/getf.asp?fid=55864</a>	Курс аккредитован 22.05.2020 г. Пилотное обучение начнется с 25.01.2021
Course 5	Устойчивое управление сельскохоз-зяйственными землями	6	14	Курс был поделен на 3 модуля. В каждый модуль были определены сроки посылки темы. Курс был обновлен на 35%. и	<a href="http://is.nkzu.kz/e-library/getf.asp?fid=46239">http://is.nkzu.kz/e-library/getf.asp?fid=46239</a>	Курс аккредитован 22.05.2020 г. Пилотное обучение начнется с 01.09.2021
Course 6	IT-технологии в лесном хозяйстве	6	14	Курс был поделен на 5 модуля. В каждый модуль были определены сроки посылки темы. Курс был обновлен на 35%. и	<a href="http://is.nkzu.kz/e-library/getf.asp?fid=45611">http://is.nkzu.kz/e-library/getf.asp?fid=45611</a>	Курс аккредитован 22.05.2020 г. Пилотное обучение начнется с 01.09.2021

Σ(Total number of updated courses) = 6

Σ(Total number of ECTS) = 33

# Table 2.2.2.NEW COURSES

Table 2.2.2.NEW COURSES

Course №	Title of the course and in which program it is taught (Bachelor, Master, 4years system for TM)	Its volume (in ECTS-hours for TM in case no ECTS)	Number of students participating in the course	Link to the course on the university page	Accreditation and recognition: Specify the date when the course was accredited in the curriculum and when the pilot teaching started
Course 1	Глобальные навигационные спутниковые системы (NAVSTAR, ГЛОНАСС, GALILEO) (бакалавриат)	5	19	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г. Пилотное обучение – 01.09.2020
Course 2	Технологии (Агро SDI, Глобальные, Глобальные системы) (магистратура)	5	9	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г. Пилотное обучение – 01.09.2020
Course 3	Основы точного земледелия (магистратура)	5	9	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г.
Course 4	Использование изображений SENTINEL-1-2-3 для мониторинга сельскохозяйственных полей (магистратура)	5	11	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г. Пилотное обучение – 01.09.2020
Course 5	Оптимизация алгоритмов компьютерного зрения и реализации в реальном времени (бакалавриат)	5	19	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г.
Course 6	Дистанционное зондирование и применение ООПТ, спутников с Земли и окружающей средой (бакалавриат)	5	19	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета математики и естественных наук №10, 11.05.2020 г.
Course 7	Компьютерное зрение в системах реального времени, магистратура, ТМ06201 – Радиотехника, электроника и телекоммуникации	5	2	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета инженерии и цифровых технологий, протокол №10, 23.06.2020. Пилотное обучение – 01.09.2020
Course 7	Глобальные навигационные спутниковые системы, бакалавриат, «Б06201 – Радиотехника, электроника и телекоммуникации»	5	7	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Совет факультета инженерии и цифровых технологий, протокол №10, 23.06.2020. Пилотное обучение – 01.09.2020 г.
Course 8	«Датчики урожайности для точного земледелия» ТМ08101 Агронимия»	5	2	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Курс аккредитован 14.06.2019г. Пилотное обучение началось с 01.09.2020 г.
Course 9	«Применения точного земледелия для выращивания сельскохозрастений культуры» ТМ08101 Агронимия»	5	2	<a href="http://is.nkznu.kz/e-library/">http://is.nkznu.kz/e-library/</a>	Курс аккредитован 14.06.2019г. Пилотное обучение началось с 27.01.2020

$\Sigma(\text{Total number of new courses}) = 9$

$\Sigma(\text{Total number of ECTS}) = 45$

### 3. Quality assurance

Reviewers from other universities were involved to assess the quality of the developed curricula in the disciplines. In particular:

-Head of the Department "Land Resources and Cadastre" of NAO "Kazakh National Agrarian Research University" Candidate of Agricultural Sciences, Professor Zholamanov K. K.

-- Head of the Department of agriculture "State Agrarian University of Northern Zauralye" "Agrotechnological Institute", Tyumen RFK. S.-agricultural Sciences, associate Professor V. V. Rzayeva

-- Dean of the faculty of natural Sciences and technology NAO "East Kazakhstan state University im. S. Amanzholov", Ph. D. of Madiyarov M. N.-

- Associate Professor of mathematics NAO "East Kazakhstan state University im. S. Amanzholov", Ph. D. Malgazhdarov E. A. Positive reviews were received for all submitted working training programs.



### 3. Quality assurance



In addition to external reviews, academic programs in the disciplines were subject to internal review, reviewed and approved at meetings of the councils of the respective faculties.

Following the results of the academic disciplines, students were asked to answer a number of questions on the principle of "Evaluate on a five-point scale". Below is a list of suggested questions:

1. Reflection of the current level of development of science in the discipline.
2. Scientific, systematic, evidence-based material on the discipline.
3. Connection of the considered discipline with other disciplines.
4. The level of theoretical knowledge you have gained after studying the discipline.
5. The level of skills you have acquired after studying the discipline.
6. Compliance of the level of training in general with modern requirements for the profession.

48 people were interviewed, the average score was 4.4, which indicates a high interest among students in the developed disciplines.

## 4. Laboratories and equipment

The schedule of the educational process for the discipline "Global Navigation satellite systems (NAVSTAR, GLONASS, GALILEO)" (bachelor course) includes a laboratory workshop of seven laboratory works:

- 1.Measurement of angles.
- 2.Distance measurement.
- 3.Determination of coordinates.
- 4.Special mode for shooting inaccessible objects.
- 5.Research of satellite antenna positioning methods.
- 6.Absolute satellite positioning method. Garmin satellite navigation receiver.
- 7.Construction of structural maps.

This workshop involves the development of students ' competencies in the practical application of geodetic equipment.

## 4. Laboratories and equipment

In the discipline "Sensors of technological processes", there is also a laboratory workshop, which includes 5 laboratory works.

1. Study of light sensors.
2. Testing of temperature sensors.
3. Study of magnetic field sensors.
4. The pressure sensor test.
5. Testing of contactless switches.

After receiving the appropriate equipment, it is planned to implement a laboratory workshop on the discipline "Using SENTINEL 1-2-3 images for monitoring agricultural fields" (Master's degree). It is planned to teach students the methods of remote sensing data processing in practice.

# 5. Dissemination and Sustainability

## 5.1. Dissemination

### Table 5.1.1 DISSEMINATION

Table 5.1.1 DISSEMINATION	
Question	Answer
1. How many and which of dissemination materials were produced (leaflets, brochures, flyers, publications etc). Please, provide designs (scans) in the presentation.	300 booklets were printed for the project awareness events. In addition, to date, two training manuals have been prepared for publication: "Astrogeodesia" and "Remote sensing and application of technologies for monitoring protected areas related to the Earth and the environment". It is expected to receive international categories. The first edition will be 50 copies of each UP.
2. Provide a link to the Internet sources where publication about the project/dissemination materials were posted.	Link to the project page on the university's website: <a href="https://www.nkzu.kz/page/view?id">https://www.nkzu.kz/page/view?id</a> Link to the project page on the social network Facebook: <a href="https://www.facebook.com/nicopa.nicopa.90/">https://www.facebook.com/nicopa.nicopa.90/</a>
3. How many non-consortium organizations (for example, universities/teachers, students, administrative staff of universities) have been informed about the project?	1. Altai State University, Barnaul, Russian Federation 2. North-Eastern Federal University, Yakutsk, Russia 3. Branch of the Institute of Nuclear Physics, Nur-Sultan 4. State Agrarian University of the Northern Trans-Urals, Russian Federation, Tyumen 5. Northwestern Technical University of Agriculture and Forestry, China, Shanxi

# Table 5.1.2. DISSEMINATION EVENTS

Table 5.1.2. DISSEMINATION EVENTS					
N	Date	Title	Target Audience	Number of participants	Is there a press-release of the event (YES/NO), if YES, provide it
1	11.11.2020	Introduction of teachers of the Faculty of Agricultural Technology to the work of the Erasmus+ project "New and Innovative Courses for Precision Agriculture (NICOPA)"	The teaching staff of the faculty of agricultural technology.	26	yes
2	04.12.2020	Introduction of teachers of the Department of Physics to the work of the Erasmus+ project "New and Innovative Courses for Precision Agriculture (NICOPA)"	Teaching staff of the department	11	yes
3	11.12.2020	Introduction of undergraduates of the Department of Physics with the work of the Erasmus+ project "New and Innovative Courses for Precision Agriculture (NICOPA)"	Undergraduates of the Department	14	yes
4	14.07.2020	Meeting with representatives of JSC "Kirov-Plant" (Petrovavlovsk).	representatives of SKU named after M. Kozubayev, representatives of JSC "Plant named after S. M. Kirov"	9	yes
5	19.12.2020	Meeting with faculty of the Department of Energy and Radio-electronics	Teaching staff of the Department of EIR	19	yes
6	04.12.2020	Meeting with students of the Department of "Energy and Radio-Electronics" on the dissemination of information about the ERASMUS+ NICOPA project	undergraduate and graduate students	30	yes

## 5.2. Regional Cooperation

### Table 5.2. INDUSTRIAL PARTNERS

Table 5.2. INDUSTRIAL PARTNERS	
Please, provide a list of new industrial partners, with which you maintain communication within the last 6 project months, and which could be interested in hiring your graduates	List of industrial partners: .... 1. "Geoskan-Kazakhstan" LLP 2. "Kazakhstan space trip" of JSC "NC" 3. JSC "Plant name: S.M.Kirova" 4. "Shagala Agro" LLP 5. "Service-ZHARS" LLP

## 5.3. Sustainability of PASO Offices

### Table 5.4. PASO Service Office

Table-5.4. PASO Service Office		
No	Question	Answer
1	Name of the person(s) responsible for PASO operation in your university	1. <u>Сартин Сергей Александрович</u> 2. <u>Шаяхметова Алтын Сейтахметовна</u> 3. <u>Савостин Алексей Александрович</u>
2	<u>Provide scan of PASO regulations approved at institutional level</u>	□
3	Provide scan of PASO work plan/business plan approved at institutional level	□
4	Indicate activities, that was already been implemented according to <u>PASO work plan</u> (title of activity, date, link to agenda, number of persons involved)	□
5	Provide link to the PASO web page at the university website / FB page or any other digital source of PASO	<a href="https://www.nkzu.kz/page/view?id=1247">https://www.nkzu.kz/page/view?id=1247</a>
6	How many NICOPA+ agreements were signed so far?	три



# 6. SOCIAL AND GENDER INCLUSION

## Table 4.1. SOCIAL INCLUSION

Table 4.1. SOCIAL INCLUSION <sup>a</sup>		
№ <sup>б</sup>	Question <sup>в</sup>	Answer <sup>г</sup>
1 <sup>б</sup>	Please, report on the Involvement of people with fewer opportunities (examples are provided below) in % of the students involved in the curricula developed in the framework of the NICOPA project <sup>в</sup>	<p>→ To unify the understanding, the European Commission has recognized the following types of the most common obstacles: ¶</p> <ul style="list-style-type: none"> <li>-→ <i>disability</i> (i.e. participants with special needs): people with mental, physical, sensory or other disabilities; ¶</li> <li>-→ <i>economic obstacles</i>: people with a low standard of living, low income, dependence on social welfare system; people in debt or with financial problems; ¶</li> <li>-→ <i>cultural differences</i>: immigrants or refugees or descendants from immigrant or refugee families; people belonging to a national or ethnic minority; people with linguistic adaptation and cultural inclusion difficulties; ¶</li> <li>-→ <i>educational difficulties</i>: young people with learning difficulties; early school-leavers; low-qualified adults; young people with poor school performance; ¶</li> <li>-→ <i>health problems</i>: people with chronic health problems, severe illnesses or psychiatric conditions; ¶</li> <li>-→ <i>social obstacles</i>: people facing discrimination because of gender, age, ethnicity, religion, sexual orientation, disability, etc.; young and/or single parents; orphans; ¶</li> <li>-→ <i>geographical obstacles</i>: people from remote or rural areas; people living in small islands or in peripheral regions; people from urban problem zones; people from less-serviced areas (limited public transport, poor facilities).<sup>ж</sup></li> </ul>
2 <sup>б</sup>	Please report on the gender balance in % of the students involved in the curricula developed in the framework of the NICOPA project <sup>ж</sup>	<p>→ девушки – 37,5 % (18 чел.) ¶</p> <p>→ парни – 62,5 % (30 чел.)<sup>ж</sup></p>



## 7. COMMUNICATION PROCESS, ADDITIONAL INFORMATION

Table 5.1. COMMUNICATION PROCESS, ADDITIONAL INFORMATION

Table 5.1. COMMUNICATION PROCESS, ADDITIONAL INFORMATION		
№	Question	Answer
1	Please, report on the communication process between your University and other PC Universities, EU partners, the Coordinator, and other project participants	<ul style="list-style-type: none"> <li>→ Inform us which means of communication you use to communicate with other PC Universities, EU partners, the Coordinator and other project participants.</li> <li>→ Do you communicate via Skype, email, telephone, etc.? What are the advantages/disadvantages of the means of communication that you use?</li> <li>→ Are there problems with the communication process? If yes, inform us about them in detail.</li> </ul> <p>В сложившейся ситуации, связанной с карантинными мерами, сотрудниками рабочей группы для обмена информацией с другими университетами используются все доступные интернет приложения (ZOOM, Skype, email и т.д.), а также социальные сети и телефония.</p>
2	Additional information	If you have any other additional important information, complaints, suggestions, problems with the project implementation process (or other project-related processes) that you want to discuss/report, please, inform us about it.



Thank you for you attention!



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