



**ACCESSIBILITY AND HARMONIZATION OF HIGHER EDUCATION IN CENTRAL
ASIA THROUGH CURRICULUM MODERNIZATION AND DEVELOPMENT
Project № 561553-EPP-1-2015-1-BG-EPPKA2-CBHE-JP**

**ERASMUS+ Programme
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Coordinated by Burgas Free University

**STATE OF THE ART OF HE IN ENGINEERING SCIENCES
IN TURKMENISTAN
ACADEMICA National Summary Report**



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A. General Information

COUNTRY:

PARTNER INSTITUTIONS (within ACADEMICA project): (Full name and abbreviation):

Elaborated by (Name of the National Coordinating Institution)	Turkmen State Institute of Finance
Contributions provided by (Name of the all partner organizations form the country which have contributed)	Turkmen State Institute of Culture
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B. Bologna Process at a National Level

1. Implementation of the Bologna three-cycle system (BA/MA/PhD)

Higher vocational education in Turkmenistan is a two-step and one-step training structure. The first stage (bachelor's degree) of higher education two-stage structure is defined as a higher education, allowing to carry out all kinds of professional work, training which is carried out in areas of training. Preparation of programs of higher education (bachelor's degree) is carried out on the basis of not less than secondary education. Education in higher educational institutions for programs of higher education (bachelor's degree) is held by full-time, part-time and correspondence courses. Admission to the number of students and the training of professional personnel in the areas of training of higher education (bachelor's degree) in higher education for part-time and correspondence courses is subject to the availability of a citizen-time work for at least two years in the workplace or in the office relevant to the chosen educational institution in the areas of training, and on the recommendation of his employer. The second stage (master's degree) of higher education two-stage structure is defined as a higher education, providing training to the independent decision of a number of professional and (or) management tasks, to conduct various kinds of educational



activities and generally to the conduct of research, training which carried out in areas of training. Preparation of programs of higher education (master's degree) is carried out on the basis of not less than higher education. Education in higher educational institutions for programs of higher education (master's degree) is held on the full-time education. Higher vocational education training single-stage structure (Specialist) is defined as the higher education, allowing to carry out all types of professional, educational and research activities, training which is carried out in the field. Preparation of programs of higher education (Specialist) carried on the basis of not less than secondary education. Education in higher educational institutions for programs of higher education (Specialist) carried out by full-time, part-time and correspondence courses. Admission to the number of students and the training of professionals in the field of higher education for part-time and correspondence courses is subject to the availability of a citizen-time work for at least two years in the workplace or in positions relevant to the chosen in an educational institution specialty, and on the recommendation of his employer. Higher professional education can be obtained in the institutions of higher education (universities) of various kinds (university, academy, conservatory, college, etc.).

One of the most consistent trends in the modern world is a dynamic multi-level integration processes in many areas of society, including such important area for the future of mankind, such as education. For Turkmenistan, which considers integration into the European space as its main foreign policy priority. This is evidenced by the discovery in 2014 of the International University of Humanities and Development. The International University will prepare qualified specialists in fourteen areas of study. Philosophy, sociology, international public law and private law, international relations, journalism, international: economics, management, finance, insurance, commerce, as well as programming, computer, information and communication technologies. First year students will be taught in the language department, perfecting and adding to their knowledge of English. After a year of language training, students will be a four-year school training in undergraduate system. It is also provided and the subsequent stage - a two-year master's degree. Teaching high school program is built on the basis of the requirements of the Bologna process, including providing for the recognition of diplomas Turkmen.

2. External Quality Assurance

Tools of quality are: teachers rating certification conducted by the Ministry of Education, accreditation by faculty teacher training, competitions, holding open sessions, attendance teachers.

3. Current state and social dimensions in Higher Education Engineering and Engineering Trade Domain

Statistical information/quantitative measures on access to higher education in general and in Engineering and Engineering Trade Domain specifically (enrollment ratio); concrete measures and policy tools toward widening participation in HE with a focus on academic program related to Engineering Sciences.

Universities of Turkmenistan accept a limited number of students. determining the quota system (higher education institutions) it is based on the applications of line ministries and agencies in the field and in the regions of the Ministry of Education of Turkmenistan. Applications are summarized, and then formed a single dial plan.

4. Effective Outcomes and Employability of Graduates in Engineering and Engineering Trade

Completion rates in Engineering and Engineering Trade Subject Areas; rates of employability of students; policies for improving completion rates, if any; policies for enhancing graduates' employability; engagement with internationalization and mobility.

Employment of graduates is carried out by the university.

C. Information related to partner institution: Engineering and Engineering Trade Subject Area

This section is designed to summarize the results of the Institutional Summary Reports of the Partner Institutions in the country considered. The source is information from the corresponding sections of the Institutional Summary Reports.

1.- Academic Programs in the field of Engineering and Engineering Trade by Institution

(Table 1 of Institutional Reports)

Area	Name of the Academic Program	Educational degree provided (<i>Bachelor, Master</i>)	Form of study (<i>part-time, full-time, distant education</i>)	Approximate total number of students	Total number of academic staff
1	Modern information systems	Subject (for all students of 1st course)	fulltime	200	6
1	Information services specialist	specialist	fulltime	50	7
1	Sound engineering	Subject (Soundman)	fulltime	30	3
1	Cinema&TV illumination engineering	Subject (Light directors)	fulltime	30	3
1	Film editing	(TV cameraman)	fulltime	50	6
1	Modern computer technology	specialization	full-time	180	11
1	Technology in sectors of the economy	specialization	full-time	180	6
1	Information systems and technology in the economy	specialization	full-time	180	11

(Please, add as many rows as necessary.)

2. Quality Indicators

a) Specify the existence of formal requirements within your institution to establish internal quality assurance systems.

Specify the existence of any structure to accomplish the above.

each HEI is responsible for its own

Turkmenistan has its own national system of Quality Assurance. According to the Law of Turkmenistan "On Education» (4 May 2013) the state control over the quality of education is provided by the establishment and functioning of the national system of quality assurance. Attestation is made by the Ministry of education and science every five years. In the total score of quality assessment of teacher knowledge is taken into account the assessment of the students received

b) Specify the average number of core (required), Compulsory Specialized subjects, specialized subjects, common and optional subjects, and elective courses included in the Program's curriculum.

The indicators in this section refer to the Program's Curriculum. They aim to assess the consistency of the academic program with the requirements of the European higher education (please write down just the total length and the number of ECTS of each type).

Table 2. Number of ECTS within each Type/area Degree

TYPE/AREA	SUBJECT TYPE	NUMBER OF HOURS
Area 1/Modern information systems / specialization	BASIC COMPULSORY (mathematic and natural sciences)	136
Specialist Full time , Information services specialist/ Area1	CORE (humanitarian and social-economic subjects)	614
	BASIC COMPULSORY (mathematic and natural sciences)	398
	COMPULSORY SPECIALIZED (general specialty)	1886
	SPECIALIZED (specialty)	2646
Area 1/Sound engineering(soundman)	SPECIALIZED (specialty)	1394
Area 1/Cinema&TV illumination engineering(Light directors)	SPECIALIZED (specialty)	412
Area 1/Film editing(cameraman)	SPECIALIZED (specialty)	204
Area 1/ Modern computer technology / specialization	Common	144
	Internship or training activities	72
	State exam	10
Area 1/ Information systems and technology in the economy / specialization	Common	136
	Exam	10
Area 1/ Technology in sectors of the economy /specialization	Common	54
	Exam	10

C) Specify briefly ways/channels used to collect information on Program's curriculum, teaching programs, learning materials.

Every year, under coordination of academic department, deans office and specialized departments collect demand data about content and number of specialties and directions. Collected data used for curriculum development and order for quota places to for sectors of Turkmenistan's economy.

d) Existence of Joint degree programs with European HEIs. Section IV.7 in the Institutional Summary Reports.



Turkmen state institute culture has a program Tempus 530574-TEMPUS-1-12012-1-ES-JPCR (Advanced Curriculum development in telemedicine for Turkmenistan) - MEDET.

e) Policy toward usage of modern approaches and methods of teaching

- **Modern approaches and methods of teaching used**

Classes are conducted through a variety of teaching methods: lectures, seminars, discussions, collective thinking.

- **Policy toward upgrading academic staff qualification.**

Upgrading and enhancement of academic staff qualification is an important point in the strategic university planning, the issue of constant concern of HR Department and all university faculties and departments. There are different ways and forms of this process, such as:

- a) Training seminars organized internally at each department on a regular basis.
- b) University methodological seminars.
- c) Participation in the international seminars, workshops, training courses.
- d) Many other ways (on-line courses, face to face and remote certified courses, research internships etc).

f) Usage of contemporary references or bibliography recommended to students

Table 2. Bibliography/references

Share of core readings (references) issued over the last five (0-5) years (% of the total number of core readings)	Share of core readings (references) issued over the last ten (0 - 10) years (% of the total number of core readings)	Share of the digital references in e-format (% of the total number of references)

g) Share of new courses (subjects) which have been introduced in the Program’s curricula over the last 3 years (% of the total number of courses/subjects in the Program’s curriculum)

0%, but every curricula every year improving program quality of education, the content of each course.

(Please, specify a number)

3.- ICT and Digital Framework

Summarize the results of the Institutional Summary Reports of the Partner Institutions in the country considered. The source is information from the corresponding sections of the Institutional Summary Reports

a) ICT-based facilities and teaching methods; digital competencies of the teaching staff.

You should include a small explanation with the following information:

- **Type of ICT methodology used: (i.e. Blended Learning, flipped learning, face-to-face learning, gamming learning, partnering learning, etc.)**



60% face-to face.

- **Type of learning:** independent, collaborative, formally scheduled.
only classroom lesson
- **Feedback:** student, faculty and administrative staff
- **Digital facilities:** i.e. Meetings, seminars, conferences, exhibitions, social and community activities
under construction.

Indicator	Value
Teaching e-platform accessible to support general teaching activities	no
On-line platform for non-presential education courses	no
ICT lab facilities for students and percentage of students that access to them	no
Number of software products used for educational purposes	CourseLab, MS Office 2010, Adobe CC 2014, VisualBasic, Delphi
Access to Wi-Fi at the university campus	Yes, but not in all institutions
Average share of academic hours per course/subject requiring usage of ICT- based teaching methods (i.e. computers and software, multimedia devices)	100% face-to-face sessions
Average share of academic hours per course/subject held in a computer lab	60-70%
Average share of the teaching staff who regularly use ICT-based methods of teaching	70-80%
Type of e-learning devices used by teaching staff (i.e. personal computer, smartphones, tablets, etc.)	Personal computer, laptops, tablets
Devices used by students in classrooms (type of personal devices: i.e. laptop, smartphones, tablets, etc.)	laptops, tablets
E-learning materials (e-based content) based on e-platform (i.e. Moodle, Sakai, Caroline, etc.)	We have access to WWW



Web based learning-MOOCs	no
Students evaluation methods	Open-ended questions; tests; traditional face-to-face; oral examination
Other non-traditional evaluation methods for transversal competences	No

b) Strategy for Digital Implementation

Refers to the existence of a strategic plan for Digital implementation in the partner universities exists.

Summarize the results of the Institutional Summary Reports of the Partner Institutions in the country considered. The source is information from the corresponding sections of the Institutional Summary Reports

Currently, within the framework of the Turkmen Education Development Strategy to ensure educational institutions with computers was carried out until 2020 (50-100 for each educational institution), interactive whiteboards (3-4 on each educational institution), continued maintenance of language laboratory and other laboratory equipment, for the last 5 years each year all first-graders (100-150 thousand) receive a free netbook. As work began on the creation of inter-university electronic networks (electronic libraries, electronic document.), Work began on the creation of modern educational content.

4.- Competitiveness of Education

a. Current tendencies in student and teaching staff mobility

Average number of students per year over the last 2 years who have <u>studied</u> abroad (excluding the EU countries)	0%
Average number of student per year over the last 2 years who have <u>studied</u> in the EU	0%
Average number of teachers per year over the last 2 years who have visited foreign academic institutions (excluding the EU countries) for the purposes of delivering lectures/seminars, conducting scientific research, project participation	4 teachers, Kazakhstan, Tadjikistan, Uzbekistan, Armenia



Average number of teachers per year over the last 2 years who have visited academic institutions in the EU for the purposes of delivering lectures/seminars, conducting scientific research, project participation.	5 teachers, Germany, Spain, Italy
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b. Employability of graduates.

- Average share of graduates (% of the average total number of graduates per year) who over the last 5 years have started a job which require professional qualification and theoretical knowledge in the field of Engineering and Engineering Trade. These are students who work in accordance with their field of study/specialty (this indicator is related to the extent of horizontal qualification mismatch).

100% Our Institutes allocates graduates to work in the specialty

- Average share of graduates (% of the average total number of graduates per year) who over the last 5 years have taken working positions which require the same educational degree (i.e. bachelor or master) as that they possess. These are students who work in accordance with the educational degree acquired (this indicator is related to the extent of vertical qualification mismatch).

100%

c. Education and training provided in a real-life working environment

Summarize the practice oriented approaches on the basis of information provided in Section IV.5 in the Institutional Summary Reports.

4 weeks of internship after 2,4,6,8 semesters, in the 10th semester of 16 weeks of internship are foreseen by curricula. Internship after 2nd semester provided at experimental laboratories, after 4, 6, 8, 10 semesters at companies of profile industry

Universities have agreements on internship with companies, ministries, banks and other. Students should fulfill an internship diary during internship. After internship, students should provide and defend detailed report.

d. University – Business links and Labor market requirements

Summarize the information in Sections IV.6 and IV.7. in the Institutional Summary Reports regarding the study on the labor market requirements and tendencies.

Following activities are within university-business links strengthening:

1. Invited lecturers from industry, companies, organizations (please see more detailed list of the companies in institutional reports);
2. The representatives from the industry are the members of the committees on the state exams.

e. Lifelong Learning (LLL) Policy

Summarize the results of the Institutional Summary Reports.

As part of its LLL policy, TSIC offers short-term courses - Computer Science, Drammen actor and film skills leading television and radio broadcasts, television and cinema operator dance of art for all comers. The duration of course - Computer Science is 12 weeks, Drammen actor and film skills leading television and radio broadcasts, television and cinema operator dance of art is 10 months.

As part of its LLL policy, TSIF offers short-term courses - Computer Science, English, Accounting and audit for all comers. The duration of courses - Computer Science, English is 12 weeks, Accounting and audit is 10 months.

D. Survey results - Questionnaires Feedback

a. Feedback from Students

In order to assess the overall situation on e-learning and degree of ICT competence at institutional level special approach is used: several types of questionnaires were developed, namely to cover the students, faculty and industry. The questionnaires are designed by the team of Universitat Politècnica de Valencia together with the members of the ACADEMICA RET (research and Educational Team) and translated to turkmen and russian by project teams of TSIF and TSIC.

The questionnaires are designed to assess the needs and perceptions of the university lecturers, industry leaders and students in engineering sciences of Turkmenistan regarding usage of ICT in Education.

TSIF and TSIC each provided surveys from 35 students from Engineering specialties, 17 lecturers in Engineering, and 10 business actors.

Students selected that represent the diversity of degrees, degree year, academic results. Lecturers selected that represent the diversity of lecturer position subject area, and teaching experience. Industry leaders and employers selected from relevant business industries.

Name of Institution	Turkmen state institute of finance	Turkmen state institute of culture
Students		
Number	20	15
Number of men	12	6
Number of women	8	9
Age range	100% people under 25 years	100% people under 25 years
The level of higher education - specialist	20	15
Main specialty		Television and radio programme director, Camera operator, TV and radio presenter, Audio control engineer, Film director
Teachers		
Number	5	12
Number of men	4	5
Number of women	1	7
Age range	3 people – 25-35, 2 people – people – 2 people above 55.	12 people – 25-35
The level of education	Candidates of sciences - 1, Senior Lecturer - 1, lecturer - 3	Senior Lecturer - 4, lecturer - 8
Employers		
Number	4	6
Profile of respondents - business	Economic sector	Culture

Position	Leading specialists	Leading specialists,
Number of men	4	4
Number of women		2
Age range	25 -35 years	25 -35 -5, 35-45 -7
The level of education	Higher professional education	Higher professional education

Thus, 35 students, 17 teachers, 10 employers took part in the survey. Total 62 respondents, among them 35 (57%) are men, 27 (43%) are women.

a. Feedback from students

After the polling done by ACADEMICA/Students the analysis of 30 respondents was carried out. Respondents answered questions based on their experience. If there were specific questions which didn't concern the respondent or which the respondent didn't understand, he or she didn't answer it and continued to answer the following questions.

a.1 Connection of ICT to the Internet: Questions: 1, 2, 5, 6, 7, 11, 13, 15

1. Do you have your own computer? Yes 22 No 13
2. Do you have internet connection at home? Yes 10 No 25
5. Daily computer usage for learning purposes:
 - Less than 1 hour 21 2-3 hours 11 more than 5 hours 3
6. Percentage of your computer usage time dedicated to personal activities?
 - 0% - 25% 12 25% - 50% 4 50% - 75% 15 75% - 100% 4
7. Percentage of your internet usage time dedicated to learning goals?
 - 0% - 25% 7 25% - 50% 6 50% - 75% 19 75% - 100% 3
11. Which of the following e-tools are you familiar with and to which extent? Tick the box that suits best your situation.

	I have heard but never used it	I can manage with some help	I can use it
Chat	34		1
Wiki	18		17
YouTube	27	5	3
Blog	32	3	
Forum	31	4	
Google search engine or similar			35
Cloud collaboration services (like google documents)	23	1	11
Learning platform	17	18	
Cloud storing services	33	2	
Other (specify)			

13. What is the level of your confidence in the usage of the following online tools?



Online Tool	High	Medium	Low
Virtual Learning Environment	13	19	3
Presentations tools like: prezi, ppt, keynote	16	19	
Databases like Mendeley Google Scholar Thomson Reuters Scopus Others:		28	7
Taking online exams of some type	13	4	18
Web Browsers	20	10	5
Search engines	17	11	7
multimedia	13	21	1
e-tutorials	12	13	10
blog		8	27
Chat	4	22	9
Forum		23	12
Electronic resources: books, papers, etc.	16	19	
Instructional video: YouTube, Vimeo		18	17
Social Media Network: Facebook, Twitter, My World, Odnoklassniki, VK, Instagram		15	20
Mailing lists	4	23	8
General applications like word processing, excel, etc.	11	24	
Computer Aided Instruction Software (interactive whiteboards / e-classes, simulators, etc.)	16	19	

15. Supporting Tools and Materials for your lecture and lab sessions (About different digital resources and tools used when you are in class.)

Instructional Tools and Materials	Never	Sometimes	Often	Very often
Own laptop	4	24	7	
Smartphone		23	11	1
Tablet	29	6		
Electronic reader		33	2	
Voice - recorder	25	10		
Printed books	21	13		
Printed materials (worksheets, journals, etc)	15	19	1	
Online/digital materials (worksheets, books, images, videos, etc)	13	16	6	
Search engines resources	17	17	1	
Online dictionary		33		2
Digital tests	21	5	4	5
Apps	12	17	5	1

a.2. University implementation of ICTs and related use: questions: 3, 4, 8, 9, 10, 12, 14, 16

3. At the University classes do you have the possibility to use your own laptop or tablet?



Yes 23 No 12

If you have answered with “No” on the question above, please specify if you have computers in class during the lectures and how many people there are per computer:

4. Do you have Wi-Fi connection at the University? Yes 15 No 20

8. Percentage of learning time using computers since 2000

0% - 25% 7 25% - 50% 9 50% - 75% 19 75%-100% 0

9. Percentage of learning time using internet since 2010

0% - 25% 6 25% - 50% 3 50% - 75% 18 75%-100% 8

10. Do you consider e-learning as an appropriate way to improve your knowledge, skills and competences? Agree 28 Neutral 7 Disagree 0

12. Have you looked for learning materials regarding to your Degree/Master subjects on internet?

Yes 32 No 3

Please specify in what domains:

Science 15 Technology 22 Engineering Mathematics 4

Languages 7 Business Others:.....

14. How many times per week do you take part in the following activities:

Internet usage	Never	At least 1	Several	Every day
Sending and reading emails	15	3	17	
Using social media: Facebook, WhatsApp, etc.	11	3	19	2
Reading or watching the news online		6	17	12
Using online resources for learning about a particular topic	16	15	4	
Searching online for practical information: job haunting, street directions, etc.	9		23	3
Taking part in online groups or forums	35			
Watching videos, playing music, gaming, etc.	18	15		2
Keeping your profile updated: Facebook, blog	32			3
Do homework on the computer	30		5	
Search online for learning opportunities: MOOCs, courses, lessons	16	3	16	
Search online for job opportunities		16	19	
Collect information online and organize it in files to be retrieved when you want	28		7	
Email with your faculty staff	18	2	15	
Email with your university mates	29	6		
Submit assignments of your degree/master subjects by email	34		1	
Submit assignments of your degree/master subjects by learning platform	33	1		1
Check your university webpage for announcements, dates, etc.	32	3		



16. In the classroom, how often are you engaged in the following? Please answer by ticking where appropriate.

	Very often	Sometimes	Never
We all listen to the teacher giving lecture (standard) classes	16	19	
We all listen student presentations/explanations	20	12	3
We read books or watch videos to clarify the lesson	2	33	
We do exercises and tasks, individually or in groups	9	26	
We work in small groups	11	22	2
I work on something at my own pace	1	33	1
We investigate and explore issues individually or in small groups and search for information about it	9	13	13
We try to solve problems	3	30	2
We explain and discuss our own ideas about important questions	16	17	2
We take time to think about how better to learn		25	10
We do lab sessions performance	8	19	8
I do follow lab classes and there is individual lab exam/test	1	32	2

a.3. Use/skills/ Impact using ICT: questions: 17, 18, 19

17. Use of ICT for learning and training

	Agree	Neutral	Disagree
I don't use computers or tablets as much as other resources (books, overhead projectors etc.) for instructional purposes	19	16	
I observe personal growth every next year of training using ICT in educational process			
I observe that a teacher in class uses the individual and differentiated approach applying ICT			

18. ICT Skills and competences. How confident are you by doing the following

ICT Skills	Not confident	Little confident	Quite confident	Fully confident
Produce text by word processing	28	3	4	
Edit digital pictures or graphic images	12	17	6	
Create a database	10	6	17	2
Digital awareness (privacy, spam, bullying, reputation)	17	13	5	
Install software on computer /tablet /smartphone	23	5	5	2
Fill online documents	19	9	4	3

19. Impact in your learning process when using ICT

Impact	Agree	Neutral	Disagree
I concentrate more on what I am learning	16	19	

It makes more difficult my learning		18	17
I feel more independent in my learning	15	16	4
I understand more easily what I am learning	12	14	9
I remember more easily what I have learnt	9	21	5
ICT enables me to work better with other students on tasks	8	17	10
ICT improves the atmosphere in class	15	19	1
It is really important to me to work with ICT for learning	18	14	3
I lose track of time when I am learning with ICT tools	4	19	12
I feel that I am learning things that will help me to get a job	21	12	2
I find those tools useful now and my further studies	15	19	1

a.4 Summarize the results of Students' questionnaires.

- What vision of ICTs arises from the students' point of view? Most of the students are interested in e-learning. They believe that e-learning will improve their knowledge, skills and competence.
- What levels of ICTs are envisaged? There are 3 levels of ICT ownership: high, medium and low.
- Are there any significant differences between students? There are no significant differences in the use of ICT among students.
- What are the main similarities between the students' answers? The main similarity between some of the students, it can be seen in questions 11, 12, 14, 16 replies.

a.5 Summarize age and details of the students who responded to questionnaires

Detailed analysis of the overall performance is the following:

- 1) according to age: middle age < 25 – 100%;
- 2) according to sex: male – 51%, female 49 %;
- 3) by level of education: specialists– 35 (100%);

b. Feedback from Lecturers

In the national level we carried out the questionnaires on 17 teachers in various engineering field.

a.1 ICTs and personal Internet connectivity: Questions: 1, 2, 3, 12, 14

1. Do you usually work with a computer? Yes 17 No
2. Do you have some tablet, smartphone or e-reader? Yes 13 No 4
3. Do you have internet connection at home Yes 12 No 5

12. Which of the following e-tools are you familiar with and to which extent? Tick the box that suits best your situation.

	I have heard but never used it	I can manage with help	I can use it
Chat	9	3	5
Wiki	12	3	2
YouTube	10		7
Blog	13	2	2
Forum	15	2	
Google search engine or similar			17
Cloud collaboration services (like google)	13	2	2

documents)			
Learning platform	10	4	3
Cloud storing services			
Other (specify):			

14. What is the level of your confidence in the usage of the following online tools?

Online Tool	High	Medium	Low
Virtual Learning Environment		16	1
Presentations tools like: prezi, ppt, keynote		16	1
Databases like: Mendeley Google Scholar Thomson Reuters Scopus Others		13	4
Creating online tests		11	6
Web Browsers	3	14	
Search engines	4	13	
multimedia	6	11	
e-tutorials	4	13	
blog		12	5
Chat		10	7
Forum		14	3
Electronic resources: books, papers, etc.	5	12	
Instructional video: YouTube, Vimeo		12	5
Social Media Network: Facebook, Twitter, VK, Odnoklassniki, My World, Instagram	2	13	2
Mailing lists	2	11	4
General applications like word processing, excel, etc.	5	12	
Computer Aided Instruction Software (interactive whiteboards / e-classes, simulators, etc.)	3	14	

a.2. ICTs and Internet connectivity at HEI: questions: 4, 5, 6,7, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19

4. Do you have Wi-Fi connection at work Yes No 17

5. Daily computer usage with teaching purposes:
 Less than 1 hour 6 2-3 hours 11 more than 5 hours

6. Percentage of your computer usage time of electronic library of HEI dedicated to scientific research and professional activity?
 0% - 25% 5 25% - 50% 50% - 75% 75%-100%

7. Percentage of your internet usage time dedicated to your private purposes?
 0% - 25% 25% - 50% 15 50% - 75% 75%-100% 2

8. Percentage of teaching time using computers since 2000
 0% - 25% 25% - 50% 10 50% - 75% 5 75%-100% 2



9. Percentage of teaching time or preparing teaching material using internet since 2010

0% - 25% 9 25% - 50% 8 50% - 75% 75%-100%

10. Do you consider e-learning as an appropriate method for the improvement of your professional skills and competences?

Agree 17 Neutral Disagree

11. Which of the following e-tools are you familiar with and to which extent? Tick the box that suits best your situation.

	I have heard but never used it	I can manage with help	I can use it
Chat	9	1	7
Wiki	11	4	2
Youtube	8		9
Blog	11	2	4
Forum	13	4	
Google search engine or similar			17
Cloud collaboration services (like google documents)	15	1	1
Learning platform	7	6	4
Cloud storing services	6	8	3
Other (specify):			
Other (specify):			

13. Have you looked for learning materials to be used in your class from internet?

Yes 17 No

Please specify in what domains:

Science 9 Technology 13 Engineering 1 Mathematics 4 Languages 2 Business 5 Others:.....

15. Support Tools and Materials for your ICT classes

Instructional Tools and Materials	Very often	Often	Sometimes	Never
Board		11	6	
Printed Materials (journals, books, worksheets etc.)	4	13		
Data Projector (beamer)	1	14	2	
Television/Video	3	12	2	
Tablet / smartphone	4	11	2	
Computer – Projector System	4	7	6	
Internet/Web Environment		13	4	

16. How often do you do the following activities with teaching purposes

Factors Encourage Technology Usage	Important	Neutral	Not important

Browse/search the internet to collect information to prepare lessons	8	9	
Browse or search the internet to collect learning materials or resources to be used by students during lessons	8	9	
Use applications to prepare presentations for lessons	6	7	4
Create your own digital learning materials for students	5	12	
Prepare exercises and tasks for students	10	7	
Post homework for students through some educational platform	1	7	9
Evaluate digital learning resources in the subject you teach	6	9	2
Download/upload/browse material from the university learning platform	3	12	2
Look for online examples of professional development opportunities	6	9	2
Use ICT to provide feedback and/or assess students' learning	7	7	3

18. Learning environment. Please answer by ticking where appropriate

	A lot	Some-times	None
I follow magistral classes, i.e. I present, demonstrate and explain lessons to the whole class	11	6	
I support and explain doubts to individual students	9	8	
Students work alone at their own pace	11	6	
Students work in groups	7	9	1
Students give presentations to the whole class	1	7	9
Students take tests and assessments	5	12	
Students are engaged in enquiry-based activities	10	6	1
Students discuss ideas with other students and the teacher	11	5	1
Students reflect on their learning	12	4	1
Students participate in assessing their work	7	7	3
I think that using technology makes it easier to reach instructional resources	13	4	
I do follow lab classes and lab sessions are evaluated just through lab sessions performance	7	7	3
I do follow lab classes and there is individual lab exam/test	1	7	9

19. Barriers to ICT Usage

Barriers	Agree	Neutral	Disagree
Lack of time to prepare ICT based materials	8	9	
Lack of adequate faculty staff skills	9	8	
Problems about accessibility to existing hardware (computer, overhead projector etc.)		17	



Inefficiency of institutions network connection	14	3	
Inefficient number of media (printer, scanner etc.) for effective use of computers	8	9	
Shortage of computers used by teachers	3	8	6
Problems about accessibility to existing learning platform	17		
Poor technical and physical infrastructure of learning environments	14	3	
Inadequacy of computers used by learners	17		
Nor or unclear benefit to use ICT for teaching		13	4
Inefficiency of guidance and support by administration		15	2
Insufficiency of financial resources for technology integration	9	8	
Inefficiency of instructional software/electronic open educational resources developed in national language	17		
Improper teaching methods for technology usage and lack of relevant models for using ICT in teaching	17		
Lack of interest of lecturers in technology usage	13	4	
Deficiency in professional development opportunities for gaining knowledge and skill	14	3	
Deficient support services for material development/technology usage	13	4	

a.3 Barriers on the way of use of ICT: questions: 20

Barriers to the use of ICT resources according to teachers' opinions are: the insufficient material and technical resources, the lack of specialized preparation of staff.

a.4 Summarize the results of Lecturer's questionnaires.

- What vision of ICTs arises from the lecturers' point of view? As we can see, all the teachers have their own personal computers. Also, to obtain the necessary information Teachers often use their own smartphones.
- What levels of ICTs are envisaged? There are three levels of ICT (low, medium, high)
- Are there substantial differences between lecturers? No significant differences.
- What are the main similarities between the lecturer's answers? Many teachers have an internet connection at home. Use the Internet to gather information for the preparation of teaching material.

a.5 Summarize lecturers details that have answered to questionnaires.

Detailed analysis of the overall performance is the following:

- 1) according to age: < 25 – , 25-35 years – 88%, 35-45 years – , 45-55 years – , > 55 years – 12%;
- 2) according to sex: male – 53%, female 47 %;
- 3) by level of education: Candidate of Science ---, PhD doctors,

c. Feedback from Industry

a.1 ICTs needs and use from workers: Questions: 1, 2, 3, 4, 8, 9, 10, 11, 12, 13



1. Do workers normally work with a computer? Yes 10 No
2. Do workers have company's tablet or smartphone? Yes 2 No 8
3. Do you provide wifi connection? Yes 3 No 7
4. Do you feel online tools as a need to work in your company? Yes 7 No 3
8. Do you consider ICT as an appropriate method for the improvement of your workers professional skills and competences?
 Agree 7 Neutral 3 Disagree 0

9. Which of the following e-tools is your company using when promoting or selling your products or services? Tick the box that suits best your situation.

	We never tried	We are starting to use	We use
Facebook	10		
Twitter	10		
YouTube promotion	9	1	
Blog entries	8	2	
Mailing lists	8		2
Cloud services	8	1	1
Own web page	8	1	1

10. Which of the following skills are important to be met by your employees. In case of several types of employees, please specify and repeat the table as many times as needed

Skill Type of Employee:	High	Medium	Low
Technical skills	5	5	
Leadership skills	7	3	
Critical thinking	10		
Problem solving	10		
Decision taking	10		
Collaboration and communication	6	4	
Creativity	7	3	
Aiming for innovations	7	3	
Motivation	6	4	
Adaptability /Flexibility	9	1	
Autonomous	5	5	
Perception	5	5	
Self-motivation	4	4	
Values:	3	5	
Devotion to the company			
Civility			
Discipline			
Honesty			
Modesty			
Justice			
Responsibility			
Responsiveness			
Interest in daily work	6	3	1
Interest in work results	5	4	1
Goals	7	3	

Team work	10		
Ability to listen to people and understand	7	3	
Analyze problems	8	2	
Deal with other specialization fields	4	6	
Report	5	5	

11. Concerning the following specific competence areas please express how much they are related to ICT skills required by your employees at their current job activities

Specific competences	Not related	Little related	Very related	I do not know
FOREIGN LANGUAGE To use freely, correctly and spontaneously the oral and written English language		1	9	
ECONOMIC, LEGAL AND SOCIAL ISSUES to understand the background of business administration		4	4	2
ENTREPRENEURSHIP AND SMALL BUSINESS To be able to establish their own business and to manage it.	4	4	1	1
DEVELOPMENT ISSUES - strategic, technology and development of new products		5		6
ICT - applied software, information systems and simulations	1	3	7	2
QUALITY MANAGEMENT To organize and manage the quality issues in the companies, including the ecology aspects.		7	1	2
PRODUCTION SYSTEMS - technology, design of PS, management of PS and automation		9		1
OPERATIONAL RESEARCH AND PROJECT MANAGEMENT To analyse, to determine the model and to solve managerial problems, with particular models (like linear programming, games theory, network analysis, etc.).	3	3	2	2
MANAGEMENT To apply the general issues of management as a scientific discipline		4	6	1
ENERGETICS - hydraulics, hydraulic machines and thermal technique				10
MECHANICAL ELEMENTS, MECHANICAL DESIGN AND ENGINEERING GRAPHICS To prepare workshop drawings and technical documentation; to be familiar with the design process; to be able to apply common mechanical elements in all types of devices.		1	1	8
MECHANICAL MATERIALS - general, testing and welding	1	2	1	6
TECHNICAL MECHANICS - statics, kinematics, dynamics and strength of materials	1	2	1	6
MATHEMATICS To be able to solve engineering problems with mathematics, including probability and statistics.		3	7	
LONG LIFE LEARNING Capability and attitude to learn and catch up his/her competences in order to confront new necessities and technological advances		2	8	

12. Digital Competence: Useful factors about employee digital competence in your company

Factors	Important	Neutral	Not important
Browse/search the internet to collect information	6	4	
Download/upload/browse material from internet sources	5	5	
Use applications to prepare presentations	4	6	
Use ICT to provide feedback	2	6	2
Basic ICT skills	4	6	
Reliable on hardware and software tools	2	6	2
Type with proficient keyboard skills	4	4	2
Manage files and email	10		
Solve technical issues	5	5	
Understand the ethical and legal implications of using digitalized content	9	1	
Provide information (reports, presentations) in a clear, understandable, appropriate format and choose a suitable means of delivery	10		
Active attitude in online activities	1	7	2
Collaborate with others	9	1	
Keep up-to-date with industry use of digital technologies	5	4	1
Translate digital skills to new environments	4	4	2
Confident trying new things and taking risks in the digital environment	4	3	3
Awareness on how being technologically and digitally updated might influence their productivity	5	3	2
Manage both the risks and the flexibility of working digitally	1	7	2
Accountable and responsible in his/her online activity and behavior	4	6	

a.2. University company collaboration: questions: 5, 6, 7

5. Does your company provide programs for university students?

>75% 75% - 50% 50% - 25% < 25% -9

6. Does your company sponsor undergraduate students?

>75% 75% - 50% 50% - 25% < 25% -10

7. Does your company provide collaborative mechanisms with universities such as teaching, mentoring, coaching students?

>75% 75% - 50% 50% - 25% < 25% -10

a.3 Barriers to ICTs usage in the company: 13

13. Digital Competence: Barriers to ICT Usage in your company

Barriers	Agree	Neutral	Disagree
Lack of adequate digital skills of your employees	10		
Problems about accessibility to existing hardware (computer,	6	4	



overhead projector etc.)			
Inefficiency of institutions network connection	8	2	
Inefficient number of media (printer, scanner etc.) for effective use of computers	7	3	
None or unclear benefit to use ICT	6	4	
Inefficiency of guidance and support by administration	5	5	
Insufficiency of financial resources for technology integration	5	5	
Inefficiency of instructional software/electronic open educational resources on national language	8	2	
Improper teaching methods for technology usage and lack of relevant models for using ICT	7	3	
Lack of interest of employees in technology usage	3	5	2
Deficiency in professional development opportunities for gaining knowledge and skill	5	5	
Deficiency in support services for material development/technology usage	5	5	

a.4 Summarize the results of Industry's questionnaires.

- What vision of ICTs arises from employers' point of view? Employers need skilled employees having ICT skills.
- What levels of ICTs are envisaged? There are three levels of ICT (low, medium, high)
- Are there substantial differences between employers? Significant differences among employers with respect to ICT have not been identified.
- What are the main similarities between the employers' answers? Employers believe that employees must have the necessary skills (Critical thinking, problem solving, decision taking, team work, manage files and email).

E. Needs and Gaps Analysis

This section presents a “needs and gaps” analysis of the ICT-based teaching approaches and the lecturers' skills. It might serve as a basis for recommendations and analysis. One matrix of the needs and gaps for each subsection is proposed. The questionnaires from lecturers/students/employers might be used in filling the tables.

Thinking about future students, current learning strategies followed by many of them before entering university, and ICT technologies:

Which key competences, skills and practices do you think that will be needed at university level to enhance students learning experience? Explain briefly under faculty staff, student and stakeholders' point of view.

a. Needs and gaps analysis of the contemporary ICT-based teaching approaches and contents used in the field of Engineering and Engineering Trade Studies

FUTURE	
What ICT-based teaching approaches and contents MUST be used in Engineering and Engineering Trade higher education	What ICT-based teaching approaches and contents MUST ACADEMICA introduce/improve.



Open and distance learning methods to promote better learning (anytime/anywhere) opportunities.	The educational platform (electronic / online training, monitoring, quality control, etc.) Improve training in information technology programs, training of qualified specialists.
What ICT-based teaching approaches and contents ARE used in Engineering and Engineering Trade higher education	What ICT-based teaching approaches and contents CAN the UNIVERSITIES introduce/improve Distance learning; virtual learning tools.
NOW	

Needs and gaps analysis regarding skills and competences of the University lecturers in line with the digital education era

FUTURE STATE	
What skills in line with the digital education era MUST the university teachers have Application of innovations, the ability to self-education, the ability to use ICT.	What skills in line with the digital education MUST ACADEMICA build/upgrade The ability to use ICT
What skills in line with the digital education era DO the university teachers possess Internet resources, ICT tools.	What skills in line with the digital education CAN the UNIVERSITIES build/upgrade E-learning methods; Internet resources, ICT tools.
CURRENT STATE	

F. Analysis results

Summarize the needs and gaps and at least 25% of the University curricula included in the National State of the Art reports prepared for each partner country should be considered for modernization.

G. General Conclusions of the Report

Following statements are desirable to note as concluding remarks:

Today, our country gains valuable experience necessary to improve the competitiveness of Turkmen education, consolidate its position in the world educational space, and in general for the construction of a society based on knowledge. In meeting these challenges directed the International exhibition and conference, initiated by the President of Turkmenistan. Among them - the International Exhibition and Conference "Education and Sports in the era of power and happiness", International scientific conference "Science, technology and innovation in the era of power and happiness" and others, held annually in our country.

The main purpose of the forum is to promote the development of education, physical culture and sports as the most important directions of the state social policy, as well as familiarization with current trends and key developments in these areas, promotion of modern technologies and the introduction of advanced techniques to improve the quality of education.