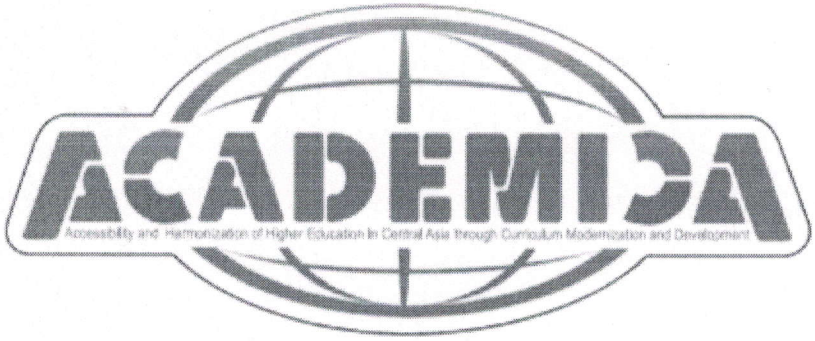

ACCESSIBILITY AND HARMONIZATION OF HIGHER EDUCATION IN CENTRAL ASIA THROUGH CURRICULUM MODERNIZATION AND DEVELOPMENT

Project № 561553-EPP-1-2015-1-BG-EPPKA2-CBHE-JP

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DEV. 2.5.1 – Modernised curricula

Country; The Republic of Kazakhstan

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Work Package Nº and Title	WP2 - Development
Deliverable Nº and Title	DEV. 2.4.1 – ACADEMICA training path national experimentation report
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Language	EN, RU or National language of the Author

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Syllabus

Course Title	ICT (Information and communication technologies)	Pre-requisite (s)	School course on informatics
Hours	135	Out of Class assignment Hours	45

Name and Contact Information of Instructors

Professors:

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Course Description

Assignment of this discipline is training of the highly qualified specialists owning skills of application of the modern information technologies in the sphere of professional area – teaching sphere. To give students the information and communication competencies that facilitate everyday life and will give an opportunity to use modern information technologies in various areas of professional activity, scientific and practical work, self-education and other purposes. In addition to the practical purpose, the course provides academic and

educational purposes, helping to expand the horizons of students, improve their general culture and education as future teachers.

Trainees profile

The student's profile includes the set of competences he/she is to possess. The student must:

Know:

- what economic and political factors promoted development of information communication technologies;
- features of different operating systems;
- architecture, performance measures of supercomputers;

Have skills:

- to use information resources for search and information storage;
- to use different social platforms for communication;
- to use different forms of e-learning for extension of professional knowledge;
- to use different cloud services.

Learning Objectives

At the end of this course, the student will be able to:

- to work with electronic spreadsheets, to execute consolidation of data, to build diagrams;
- to work with databases;
- to project and create simple web-sites;
- to make processing of vector and bitmap images;
- to create multimedia presentations including prezi, 3D.

Pedagogical aims to be reached

- Acquaintance with modern methods on the use of means of ICT.
- Training in use of means of ICT in professional activity of future teachers.
- Training in effective application of means of ICT in educational process, including work with the distributed information resource of educational appointment.
- Acquaintance with opportunities of practical realization of the training focused on use of technologies of multimedia, systems of artificial intelligence, the information systems functioning on the basis of computer facilities, providing automation of input, accumulation, processing, transfer, operational management of information.

Pedagogical methodologies used:

Methodologies include: individual approach, communicative and interaction based techniques, participative approach, problem-based teaching.

Pedagogical tools

Pedagogical tools include:

1) case-studies
2) methods of peer assessment and self-assessment
3) mind-mapping
4) brainstorming
5) reporting

6) formative rubrics based evaluation
7) mentoring, tutoring, scaffolding

Environment used

Environment includes three aspects: psychological, material and pedagogical aspects,
Psychological environment must correspond to the mode of face-to-face and mediated teaching and learning (stress-free, comfortable and relaxing).
Material environment is comprised by the set of equipments used for performing the tasks – Computers/gadgets, Internet connection, mobile devices.
Pedagogical environment – creation of the pedagogically friendly interaction (partner-partner mode), using peer and self-assessment, error correction in the mediated form.

Course Timing

Course timing is presented below:

	Form of training			
	full-time		part-time	
	on the base of general secondary education (period of study - 4 years)	condensed on the base of technical and professional, post-secondary education (period of study - 3 years)	condensed on the base of technical and professional, post-secondary education (period of study - 3 years)	condensed on the base of high education (period of study - 2 years)
Total hours by Working Curriculum, including	135			
lectures	15			
practical (seminar)	30			
laboratory work	-			
SIWT	45			
SIW	45			
Exam (semester)	1,2			

Course Modality

The course has the combination of face-to-face mode with elements of blended and distance learning. Course studying expected following classes forms: lectures, practical, SIW, SIWT

Course Structure

Topical Outline and Schedule

DATE	Weeks 1-3 - Module title: Basics of ICT and introduction to computer systems
Topics	The main topics of this module are: 1) An ICT role in key sectors of development of society. Standards in

	the field of ICT. **Pedagogical aspect of ICT** 2) Review of computer systems. Evolution of computer systems. Architecture and components of computer systems. Use of computer systems. Data presentation in computer systems. **Functional organization of computers**. 3) Software. Operating systems. **Input, output, processing and storage devices. Protecting systems and data.** Understand how ICT components and systems are used to store and retrieve information
Learning activities	The Module **Basics of ICT and introduction to computer systems** is composed the following activities: **-interactive lectures (problem based activities, case study method and demonstration);** **-practical assignments (tutorials, brainstorming, solving cases on troubleshooting, mindmapping on mindmeister.com).**
OUT OF CLASS Activities & ASSIGNMENTS & ASSIGNED READINGS	**Reading:** Recommended literature to be studied and drafted by students: 1. June J. Parsons, New Perspectives on Computer Concepts 18th Edition—Comprehensive, Thomson Course Technology, a division of Thomson Learning, Inc Cambridge, MA, COPYRIGHT © 2016; ISBN-10: 1-4239-0610-1, ISBN-13: 978-1-4239-0610-0. 2. Reema Thareja Fundamentals of Computers. – Oxford University press: Oxford, 2014. - 288p 3. George Beekman. Computer Confluence: Exploring Tomorrow's Technology. ISBN 0130661880, 9780130661883. Prentice Hall, 2003 **Conducting research:** **Report by using prezi –** 1. Definition of ICT. Subject ICT and its purposes. 2. An ICT role in key sectors of development of society 3. Standards in the field of ICT. 3. Communication between ICT and achievement of the objectives of the a sustainable development in the Millennium Declaration. 4.The history of computing techniques development. Generations of computers 5. Review of computer systems. Evolution of computer systems. 6.Architecture and components of computer systems. 7. Basic devices of personal computer 8. Input devices 9. Output devices 10. Devices for storage and processing of information **Peer review** **Self-evaluation in the form of self-assessment sheets.** **Blogging (mypage.ru)**
DATE	**Weeks 4-6 - Module II: Human computer interaction**
Topics	The main topics of this module are: 1) Human computer interaction. Physical and mental and psychological characteristics of the user. Development stages of the user interface. Types of testing of interfaces (testing of users). **Teacher-student-**

	intrface mode. 2) Database systems. **Technology of programming of ORM. The distributed, parallel and heterogeneous databases.** Data models. Normalization. Integrity constraint on data. Fundamentals of SQL. Design and development of databases 3) Data analysis. Data management Methods and stages of Data collection. Data models. Normalization. Integrity constraint on data. Fundamentals of SQL. Design and development of databases.
Learning activities	The Module **Human computer interaction** is composed the following activities: **-problem-based lectures (problem based activities, case study method and demonstration, video and podacast using);** **-practical assignments (ORM, SQL, creating questionnaires on surveymonkey, creating posts on FB).**
OUT OF CLASS Activities & ASSIGNMENTS & ASSIGNED READINGS	**Reading:** Reading on the following topics: 1. Bases of management systems database: concept, characteristic, architecture. 2. Data models. Normalization. Integrity constraint on data. Fundamentals of SQL. 3. Design and development of databases. 4. Technology of programming of ORM. 5. DBMS MS Access: assignment, common functions and modes. 6. Access objects, their role in relational database structure. 7. Database queries, tools for queries creation. Operators and expressions for queries creation. Queries types. **Conducting research – presentation of the report (see above)** **Report /presentation preparation (ppt/prezi formats)** 1. Introduction to DBMS (Database Management System) Access. 2. The create table, forms, searching, sorting, and filtering data. 3. Create relationships between tables. 4. Create query, report, switchboard and macro. 5. Visualization of data. **Creation of the algorythm on data management:** 1. Compare methods of data collection. 2. List and describe the six components that stages of Data mining. 3. Give the classification types of data. 4. Describe the objectives of data mining. **Essay writing "Data management and my teaching profession"** **Self-assessment test (10 questions)** **Peer review / teacher review/combined**
DATE	**Weeks 7-9 - Module III: Networks**
Topics	The main topics of this module are: 1) Network basics. **Architecture. Peer-to-peer networks. Client/server networks.** 2) Cyber security. Stack protocols: TCP/IP, OSI. IP-addressing. Local and wide area networks. Wire and wireless network technologies. DHCP protocol. 3) Internet technologies. Service DNS. Web technologies: HTTP, DHTML, CSS, and JavaScript. E-mail. Message format. SMTP, POP3, IMAP protocols. **Social networks and pedagogically mediated technologies.**

Learning activities	The Module **Networks** is composed the following activities: **-problem-based lectures (problem based activities, case study method and demonstration, video and podacast using);** **-practical assignments (ORM, SQL, creating questionnaires on surveymonkey, creating posts on FB).**
OUT OF CLASS Activities & ASSIGNMENTS & ASSIGNED READINGS	**Reading:** Reading on the following topics: 1. Internet services and their characteristics. 2. Internet data send protocol. Internet addressing system and naming operation of the resources 3.Client and server software of Internet. 4.Internet search engines. Search engine's query languages 5. Telecommunication technologies. 6. Security risk of information and their classification. 7. Industry of cybersafety. 8. Cybersafety and control of the Internet. **Conducting research – the list of assignments:** 1. Compare LANs, WANs, and MANs. 2. List and describe the four components that differentiate networks. 3. Compare the two types of network architectures (Computer laboratories 422 and 424) 4. Explain topology and the different types found in networks. 5. Describe TCP/IP along with its primary purpose. 6. Identify the different media types found in networks. **Report /presentation preparation (ppt/prezi formats)** 1. Data analysis bases. 2. Methods of data collection, classification and prediction. 3. Decision trees. 4. Processing of large volumes of data. 5. Methods and stages of Data mining. Tasks of Data mining. 6. Visualization of data. 7. Data transfer devices, transmission medium. 8. Data transmission environment and channels 9. Types of networks. Concept of network. 10. Networks classification. Local and global networks. Local network elements **Creating a video podcast on the topics:** 1. Data protocols 2. Stack protocols: TCP/IP, OSI. IP-addressing 3. Local networks architecture and their features 4. Local and wide area networks. Wire and wireless network technologies. 5. File-server, client-server architecture 6. DHCP protocol. 7. Technologies of connection to the Internet. 8. Internet and IntraNet networks. **Self-assessment test (10 questions)** **Peer review / teacher review/combined**
DATE	**Weeks 10-13 - Module IV: E-technologies**
Topics	The main topics of this module are: 1) Cloud and mobile technologies. Web-service in the Cloud. **"Infrastructure as a Service" или "IaaS"/ "Platform as a Service",**

	"*PaaS*"/"Software as a Service" или "SaaS". Main terms and concepts of mobile technologies. Mobile services. Standards of mobile technologies (CIF, 3G, 4G). 2) Multimedia technologies. Representation text, audio, video and graphical information in a digital format – podcasts, video hosting. Basic technologies for compression of information. 3-D representations of the virtual world and animation. Instruments of development of multimedia applications. **Use of multimedia technologies for education.** 3) Smart Technology. Internet of things. Big data. Technology Block Chain. Artificial intelligence. Use of Smart-services. **Green technologies in ICT.**Teleconferences. Telemedicine. 4) E-technologies. Electronic business. E-learning. Electronic government. **Blended and distance learning.**
Learning activities	The Module **E-technologies** is composed the following activities: **-e-learning elements (Edmodo platform, LMS demonstartion on distance learnng)** **-problem-based lectures (problem based activities, case study method and demonstration, video and podacast using);** **-practical assignments (creating podcasts, demonstration of 3D presentations, UGM tools acquisition).**
OUT OF CLASS Activities & ASSIGNMENTS & ASSIGNED READINGS	**Reading:** Reading on the following topics: 1. Main terms and concepts of mobile technologies. 2. Mobile services. Standards of mobile technologies. 3. Representation text, audio, video and graphical information in a digital format. 4 Basic technologies for compression of information. 5. 3-D representations of the virtual world and animation. 6. Instruments of development of multimedia applications. 7. System of presentation graphics MS Power Point: assignment, opportunities, interface 8. Work technique in PowerPoint environment. Creation of presentation slide 9.Text entering and editing in presentation slides 10. Insert the objects into slides (pictures, tables, charts, organizational charts, etc.) **Conducting research – the list of assignments:** 1. Describe the Use of Smart services (ex: Kahoot.it). 2. Describe the goals of green technology (prezi). 3. Compare Teleconferences and Telemedicine (Venn's diagramme). **Report /presentation preparation (ppt/prezi formats)** 1. Including animation effects into slides. 2. Use of multimedia technologies for planning, descriptions of business processes and their visualization. 3. Internet of things. 4. Big data. 5. Technology Block Chain. 6. Artificial intelligence. 7. Use of Smart-services. 8. Green technologies in ICT. 9. Teleconferences. 10. Telemedicine.

	11. Electronic business: Main models of electronic business. 12. Information infrastructure of electronic business. 13. Legal regulation in electronic business. 14. Electronic training: architecture, structure and platforms. 15. Electronic textbooks. 16. Electronic government: concept, architecture, services. 17. Blended learning. **Presnting the smart technologies to be used in education (according to the specialty)** **Self-assessment test (10 questions)** **Peer review / teacher review/combined**
DATE	**Weeks 14-15 - Module V: IT in the professional sphere and perspectives of development of ICT**
Topics	The main topics of this module are: 1) Information technologies in the professional sphere. Industrial ICT. **Identifying health and safety risks as a result of misusing ICT. Awareness of what constitutes a safe and healthy ICT environment.** The software for the solution of tasks of the specialized professional sphere. Modern IT trends in the professional sphere: in school, in high education, etc. Use of search engines and electronic resources in the professional teaching purposes. 2) Perspectives of development of ICT. Prospects of development perspectives in the sphere of IT of the market: development of the free software. **Forming of an ecosystem of IT of entrepreneurship and support small startup of the companies.** Programs of acceleration and incubation. Development of necessary infrastructure of electronic payments and logistics. Prospects of development of E-technologies.
Learning activities	The Module **IT in the professional sphere and perspectives of development of ICT** is composed the following activities: **-e-learning elements (Edmodo platform, LMS demonstartion on distance learnng)** **-interactive lectures (problem based activities, case study method, prioritising techniques, critical thinking developing techniques);** **-practical assignments (booklette creating).**
OUT OF CLASS Activities & ASSIGNMENTS & ASSIGNED READINGS	**Reading:** Reading on the following topics: 1. Prospects of development of E-technologies. 2. Determination of requirements to development "convenient in application" the Web site 3. Design and Creation of the presentations of lecture material, scientific reports, etc. 4. Creation of a simple network configuration. IP addressing. Monitoring of a network. Analysis of traffic. Use of sniffers for the analysis of network packets. 5. Use of hardware and software for key generation. Application of the EDS and encoding in case of message exchange by E.-mail. 6. Operation with services on the website of the electronic government http://egov.kz/cms/ru/government-services/for_citizen: registration of requests, obtaining counterparts of documents etc. 7. Development of structure and the maintenance of a lesson in the environment of remote learning: Moodle, eDX, etc. 8. Installation and use of application programs in the professional sphere

Conducting research – the list of assignments:
1. Data acquisition from the server. Design of the graphic interface. Web applications. Creation of styles – laboratory work.
2. Creation of Google of accounts with use of Google Docs. Use of mobile technologies for receiving an information access, GPS navigators, GSM a signaling – creating googleforms as an assessment tool.
3. Operations with Smart-applications: Smart TV, Smart Hub, etc.(prezi)

Conducting a booklette on the perspectives of ICT in E-education (school/university).
Self-assessment test (10 questions)
Peer review / teacher review/combined
Formative assessment

Assessment tools at the end of the course

Control works and presentations of the reports are mandatory for and must be handed in established periods. The works performed with delay automatically will be estimated lower.

Total points of attestation are put down taking into account attendance, execution of independent work of the student, in established periods, responses during the lessons in the oral or written form, results of the attestation control.

If the student skipped classes and couldn't pass the work in the established periods due to illness or other good reasons documented, the relevant organization, he has the right for personal passing of intermediate control.

Any writing off or plagiarism (use, copying of ready-made works and decisions of other students) will be stopped by way of exception from audience and/or punishment by an assessment under the "unsatisfactorily" heading.

SCALE OF ASSESSMENT OF KNOWLEDGE

Table 1

Forms of control

Type of class / form of control	number of points in %	coefficient	1 ASSESMENT		2 ASSESMENT		Total final examination, the number of points in %	Final control, the number of questions / tasks
			number of lessons / tasks	number of points in %	number of lessons / tasks	number of points in %		
Lectures	-	0,1	7 lessons	10	8 lessons	10	(1 assessment +2 assessment)/2+FC	-
Seminars	50-100 for a participation	0,5	7 lessons	50	8 classes	50		-
Practical work/Individual work	50-100 for implementation of a task	0,4	7 lessons	40	8 classes	40		-
Exam	-	-	-	-	-	-		-
CT	(0-100%)	-		-	-	-		40 test questions
Total (in %)	-	-	-	100% or 30 points	-	100% or 30 points		**(1Ass.+2As) /2 + FC**

Table 2

Distribution by type of rating points of control

week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Type of	Cc	Cc	Cc	Cc	Cc	Cc	Att	Cc	Cc	Cc	Cc	Cc	Cc	Cc	Att
Control	1	2	3	4	5	6	1	8	9	10	11	12	13	14	2
Point	50-100%	50-100%	50-100%	50-100%	50-100%	50-100 %	The average % 30 points	50-100%	50-100 %	50-100%	50-100 %	50-100%	50-100%	50-100 %	The average % 30 points

Table 3

Distribution of rating points after the examination

Evaluation of students' correct answers in %	Points	Grade
90-100	37-40	5 (excellent)
75-89	31-36	4 (good)
50-74	20-30	3 (satisfactory)
0-49	0-19	2 (unsatisfactory)

Instructional Materials and References

Main

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16. http://marklv.narod.ru/inf/
17. http://infoschool.narod.ru
18. http://www.syrtsovasv.narod.ru
19. http://www.phis.org.ru/informatika/
20. http://www.rusedu.info
21. http://iit.metodist.ru
22. http://book.kbsu.ru
23. http://school87.kubannet.ru/info/

Verified on the University level: KSPI

Reviewed and recommended on the meeting of the department

Protocol № 9 dated from 10 May 2017.

The Head of the Department _____ Eslyamov S.G.

Approved by the methodical bureau of the faculty

Protocol № 7 dated from 13 May 2017.

The Chairperson _____ Radchenko T.A.

Considered and recommended at the Faculty Council

Protocol № 9 dated from 20 May 2017.

The Chairperson _____ Sukhov M.V.

Approved by the Scientific and Methodological Council of the Institute

Protocol № 5 dated from 26 May 2017.

The Chairperson _____ Kifik N.Y.