Support to strengthening the higher education system in Azerbaijan

TWINNING

Twinning project ENI/2018/395-401

Mission Report

Short-Term Mission on Activity 1.5. Provide recommendations for improvement of education standards for qualification for programmes in the priority areas (incl. legislative arrangements) with a view to describing achievements based on competences and skills, considering the AzQF

(October 7 - 11, 2019)

1. **Name and Function of the Expert:**

Full name of expert

Ms. Jānis Mencis, Latvia

Signature

2.   <u>**Objective and Tasks of the Mission:**</u>

The mission is carried out within the framework of:

COMPONENT 1: **SELECTED NATIONAL EDUCATION STANDARDS ARE ALIGNED TO INCLUDE A COMPETENCE-BASED FOCUS**

Activity 1.5. Provide recommendations for improvement of education standards for qualification for programmes in the priority areas (incl. legislative arrangements) with a view to describing achievements based on competences and skills, considering the AzQF

Benchmarks for this activity are:

- **State standards for selected study programmes (Math teacher state standard) are revised**, with a view to describing achievements based on competences and learning outcomes, considering AzQF;
- **Other relevant documents/ methodology materials are prepared**.

3. <u>**Time schedule of the mission:**</u>

Date and Time	Activity
Monday 7th of October 2019	Meeting with RTA Ms. Elizaveta Bydanova and Ms. Vusala Gurbanova, Component Leader I, Senior Advisor at Higher Education Department, Ministry of Education
Tuesday 8th of October 2019	Meeting with Working Group on Informatics Teacher. (See the Annex for the list of participants)
Wednesday 9th of October 2019	Meeting with Working Group on Math Teacher (See the Annex for the list of participants)
Thursday 10th of October 2019	A visit to Azerbaijan State Pedagogical University, Baku State University and Baku Engineering University to meet with academic staff from relevant chairs to learn their views and suggestions regarding the state standard for the study programmes in Informatics Teacher and Math Teacher.
Friday 11th of October 2019	1) Report writing 2) Meeting with RTA Ms. Elizaveta Bydanova and staff of the MoE Higher Education Department to debrief about the results of the mission.

4. Relevant Background Information/State of Affairs regarding the mission

1. CLASSIFICATION of Master Level Specialties (Programmes) of Higher Education of the Republic of Azerbaijan.

2. CLASSIFICATION of Bachelor Level (Main (Basic) Medical Education) Specialties (Programmes) of Higher Education of the Republic of Azerbaijan.

3. "A methodological compendium on identifying and defining learning outcomes" developed by Twinning experts.

4. PPT – "Twinning Project SUPPORT TO STRENGTHENING THE HIGHER EDUCATION SYSTEM IN AZERBAIJAN ENI/2018/395-401 2018-2020 BRIEF INTRODUCTION INTO MAIN STAKEHOLDERS" developed by the Twinning office.

5. Standards of study programmes in Physics, Ecology and Foreign language teacher for Bachelor level elaborated within the Twinning project.

6. Standards of study programmes in Informatics teacher and Ecology for Bachelor level.

7. Decree of the Cabinet of Ministers of the Republic of Azerbaijan "On the approval of the National Qualifications Framework for Lifelong Learning of the Republic of Azerbaijan."

8. "STE Welcome Package. AZERBAIJAN" developed by the Twinning office.

5. Achievement of the Expected Results

Planned action was achieved. Three universities (Azerbaijan State Pedagogical University, Baku State University and Baku Engineering University) were visited and the state standard of Math Teacher study programme was discussed with professionals from local universities and recommendations were provided.

At the Ministry of Education, a meeting with the Working Group on Math Teacher was organized and their opinions concerning the existing study program of Math teacher for Bachelor level were collected.

6. Unexpected Results

No unexpected results were met during the mission.

7. Issues Left Open After the Mission

It is desirable for the academic staff involved in Mathematics teaching to engage more actively in discussions.

8. Recommendations (including recommendation for future missions)

It is recommended:

1. To introduce the entrance examinations when enrolling students in the study programme. This entrance examination shall check for students' motivation (reasons for choosing teaching

profession shall be checked during the written part of the examination and the justification for the choice of teaching profession during the oral part (interview). The participation in national or international Olympiads and scientific conferences of students shall be considered as an advantage. The entrance examination should be accompanied by evidence (if any) of previous teaching experience (work in children's and youth camps, Sunday school; nanny work, etc.) and voluntary work (participation in youth NGOs. Participation in interest education (camps, courses, seminars, etc.)).

2. To introduce online learning management systems at all universities. This would foster the availability of learning materials for students, solve the problem of insufficient internet access and provide a database of student achievement.

3. To split subjects in smaller amount of ECTS which allows to have a wider range of subjects, and subject content area can be distributed along the study program so that some important issues are repeated during the four-year study giving students an opportunity to strengthen and complement the relevant knowledge and skills. For example, it is recommended to have different 3 ECTS courses of programming in various semesters instead of one 9 ECTS course at once.

4. To divide the internship into several parts and spread it among study semesters and divide it into observational and teaching parts where most of the time is devoted to actual teaching at school.

5. To introduce a small amount (e.g. 9 ECTS per programme) of totally elective study courses which would facilitate recognition of ECTS gained in mobility and enrich students' study experience.

6. To introduce or restore a study course "Introduction to the teacher profession" for all teacher programmes.

7. To design all study courses in a manner that would help to develop students' skill of learning to learn.

8. To take the competencies of specialty (teacher profession) as basis when preparing the standard of a study programme.

9. To prepare the national standard by consulting appropriate study programmes of leading universities around the world.

10. To avoid subjects inappropriate for the specialty in the block of compulsory subjects.

11. To compose the study programme in a way that it covers the content of secondary education's curriculum in a more in-depth manner.
12. In the future, we recommend that projects' experts get a prior good knowledge of the situation in the particular field.

9. Acknowledgments (if any)

Annexes

Annex 1

Professional Bachelor Study Programme "Math teacher"

(full time studies, 8 semesters)

STUDY PLAN

Professional Bachelor's study programme
with qualification: secondary school mathematics teacher
(full time 8 semesters)

Course title	Year 1		Year 2		Year 3		Year 4		Total
	1. s.	2.s.	3. s.	4.s.	5.s.	6.s.	7.s.	8.s.	
Personality Development in the Process of Socialization			4						4
Learning : Theory and Praxis					2				2
Make of the Curriculum						2			2
Learning environment						2			2
Introduction to Inclusive Pedagogy							2		2
Research in teachers' professional activity								2	2
Introduction to Law					2				2
Entrepreneurship						2			2
Oratory						2			2
Science Teaching Methodology I				4					4
Science Teaching Methodology II					4				4
Information technology in education I			2						2
Information technology in education II				2					2
Information technology in education III					2				2

Study work 3							2	2
Study work 2						2		2
Study work 1						2		2
Teaching practice I		2						2
Teaching practice II			2					2
Teaching practice III					4			4
Teaching practice IV						8		8
Teaching practice V							8	8
Teaching practice VI							2	2
Bachelor's Thesis							12	12
Mathematical Analysis I	**4**							4
Mathematical Logic and Set Theory	**2**							2
Linear Algebra and Analytic Geometry I	**4**							4
Mathematical Analysis II		4						4
Linear Algebra and Analytic Geometry II		2						2
Mathematical Analysis III			2					2
Differential Equations I			4					4
Introduction to complex analysis					2			2
Courses of subject								24
Branch specific theoretical specialisation								
Programming and Computers I	**4**							4
Elements of combinatorics	**3**							3
Number Theory	**3**							3
Programming and Computers II		4						4
Physics for Natural Sciences		5						5
Practical work in elementary mathematics		3						3
Methods of teaching Mathematics I		2						2
Numerical Methods I			2					2
Computers in the Process of Education I			2					2

Differential exercises in elementary mathematics			2						2
Methods of mathematical physics				2					2
Numerical Methods I				2					2
Computers in the Process of Education II				2					2
Probability Theory				4					4
Mathematical Statistics					4				4
Methods of teaching Mathematics I						4			4
Methods of teaching Mathematics III							4		4
Courses of subject									52
Total in section A	0	0	8	8	14	16	14	18	78
incl. general education study courses,									20
branch specific core courses									14
branch specific professional specialisation courses									6
practical work,									26
Bachelor's paper									12
Total in section B	20	20	12	12	4	4	4	0	76
incl. branch specific core courses									24
branch specific professional specialisation courses									52
Elective part (section C)	0	0	0	0	2	0	2	2	6
Total in the programme	20	20	20	20	20	20	20	20	160

Annex 2 Sample of course programs

The Open University (UK)

http://www.openuniversity.edu/courses/qualifications/q46

The Open University is incorporated by Royal Charter (RC 000391), an exempt charity in England & Wales and a charity registered in Scotland (SC 038302). The Open University is authorised and regulated by the Financial Conduct Authority in relation to its secondary activity of credit broking.

BSc (Honours) Mathematics and its Learning: full time studies – 3-4 years; 360 credit points; study method – distance learning.

Course program

Stage 1 (120 CP)

        Discovering mathematics

        Essential mathematics 1

        Essential mathematics 2

        Introducing statistics

Stage 2 (120 CP)

        Pure mathematics

        Mathematical methods, models and modelling

Stage 3 (120 CP)

        Developing algebraic thinking

        Developing geometric thinking

        Developing statistical thinking

One module to choose (30 CP)

        Applications of probability

        Complex analysis

        Deterministic and stochastic dynamics

        Graphs, networks and design

        Mathematical methods and fluid mechanics

        Optimization

Karlsruhe Institute of Technology (Germany)

http://www.math.kit.edu/lehre/seite/lehramt/de

Bachelor for education (gymnasium)

Mathematics for teaching: full time studies 2 years; 78 credit points

Course program

Scientific foundations of mathematics (78 CP)

        Linear algebra 1

        Linear algebra 2

        Analysis 1

        Analysis 2

        Analysis 3

Numerical analysis

Stochastics

Geometry

Mathematics didactic

Practice

Mathematics between school and high school

Digital tools for mathematics

Subject-specific didactics of mathematics lessons

Students' projects and cooperation with schools

University of the West of Scotland

https://www.uws.ac.uk/study/undergraduate/undergraduate-course-search/mathematics-with-education/

BSc (honours) Mathematics with Education: full time studies of 4 years (The study of Education is introduced in Year 3 with the opportunity to apply the knowledge in a professional setting through high school experience placements in Year 4); 360 (480) credit points

Course program

Core modules I

Dealing with Data

IT Skills and Mathematical Software

Mathematics of Space and Change

Mathematics of Space and Change 2

Sequences and patterns

Optional

Introduction to Programming

Introductory Physics

Scientific Investigation

Core modules II

Discrete Mathematics

Probability and Statistics

Differential Equations

Linear Algebra

Numerical Analysis

Core modules III

Advanced Calculus

Statistical Estimation and Inference

School and Professional Studies

Optional

Coding and Cryptography

Complex analysis

Mechanics

Numerical Solution of ODEs

Core modules IV

Secondary STEM Subject Studies

Secondary School Experience

Regression Methods and Experimental Design

Partial Differential Equations

Optional

STEM Work Based Learning

University of Wrocław (Poland)

http://rekrutacja.math.uni.wroc.pl/index.php?www=matematyka-nauczycielska

BC **Mathematics for teaching**: full time studies of 4 years; 531 (ECTS)

Bachelor's studies in this specialization prepare for teaching in elementary school, and allows graduates to teach in all types of schools upon completion of master's degree. Studies in the teaching specialty consist of several blocks: mathematical, psychological, pedagogical and didactic. Math block classes provide solid education in mathematical analysis, algebra, logic and geometry.

Course program

Core module

Stage 1

Calculus 1

Calculus 2

Calculus 3

Introduction in mathematics

Combinatorics

Linear algebra 1

Linear algebra 2

Algebra 1

Topology

Theory of probability

Differential equations

Programming

Foreign language (English or German)

Intellectual property rights

Stage 2

Module 1

Programming in R

Introduction in arithmetic

Introduction in geometry

Basics of statistics

Module 2

Psychology of teaching

Pedagogic of teaching

Voice emission

Educational regulations

Teacher's psychological and pedagogical competence

Module 3

Didactic
Observation practice – didactic
Methodology of scientific mathematics
Practice of scientific mathematics
Popular scientific events

University of Eastern Finland

https://kamu.uef.fi/wp-content/uploads/2018/05/LUMET-opinto-opas-2017-2018.pdf

BC Mathematics: Full time studies (180 ECTS); 3 years for Bachelor of Science; 2 years for Master.

Basic education focuses on becoming a mathematics teacher by completing a Bachelor of Science degree and a Master of Philosophy degree in either a mathematics subject and a classroom teacher program.

It is recommended that the Bachelor's degree include 25 ECTS credits for pedagogical studies and 25 ECTS for basic studies of another subject (for example, Physics or Chemistry). It is recommended to start studying the second subject already from the first year.

Course program for Bachelor of Science

General studies (4CP)

University studies start

Introductory course in natural sciences and mathematics

Math Information Retrieval

Language and communication studies (9 CP)

English Academic Reading Skills for Mathematics, Physics and Chemistry

Sweden Academish Reading Skills for Mathematics and Physics

Written communication skills for mathematics, physics, chemistry and computer science

Speech communication for science

Differential calculus

Fundamentals of the collaborative learning process

Practicing the basics of teaching

Basic studies in mathematics (25 CP)

Differential calculus

Integral calculus

Introduction in Mathematics

Multivariate differential calculus

Basic and subject mathematics for teachers (70 CP)

Basics of mathematics

Linear algebra

Real analysis

Algebra

Basic course of statistics for teachers

Probability theory

Euclidean geometry

School Mathematics Exercise Course

LaTeX course

Bachelor thesis

Optional (4CP)

Differential equations

Basics of Numerical calculations

Topology

Theory of probability

Linear algebra

Technology to support the study of mathematics

Teachers' pedagogical studies (25 CP)

The basics of learning and development

Orientation to Teaching

Orientation training

Learning and pedagogical support

Fundamentals of the collaborative learning process

Practicing the basics of teaching

Different study for teacher education (25 CP)

Text skills and language skills

Exploratory Learning in Science Teaching and Learning

Literature education

Fundamentals of Art and Art Pedagogy

Basics of Audience Pedagogy plus Applied Drama

Annex 3. Suggestion for a new state standard in the field of Mathematics Teacher in Azerbaijan

Attached in a separate file