

## **Sustainability Strategy**

### **Teaching and problem - based learning at State University of Medicine and Pharmacy "Nicolae Testemitanu"**

#### **Work Package 5**

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## **Summary**

The purpose of this Sustainability Strategy is twofold. One, the strategy aims to suggest how to ensure a transition from the pilot PBL study program to a fully-fledged PBL-based study by 2022 (sections 3, 4, and 5). Two, it aims at ensuring sustainability of PBL as a teaching and learning method by putting forward recommendations (section 6). These two aims are supported by inputs from section 2 in which the team discusses lessons learned, challenges encountered during the implementation of the pilot program and reflects on these.

## List of definitions

**PBL** - student activity model with group task assignment to solve a problem, which is the cumulative result of activities from several courses, constituting an interdisciplinary product, guided by the teacher responsible and evaluated by practitioners in the field.

**Student-centered learning** - teaching and learning process in which the student becomes a partner in the educational process, and the teacher-student relationship is based on cooperation and collaboration.

**Self-guided learning** – teaching and learning process that emphasizes the student’s responsibility to create learning and experimentation environments, in which they discover knowledge, make discoveries and solve problems on their own.

**Learning objectives** – general competences by training fields required for graduates of study programmes.

**Learning outcomes** - clear results, describing the student’s knowledge or skills, expected from the teaching-learning process.

**Progression** – succession of expectations from the teaching-learning process in several stages.

**Assessment** - multicriterial examination of students’ knowledge accumulated in the learning and teaching process.

**Projects** – are tasks given to students which consist of research and analysis of a problem (both theoretical and practical) and the generation of new approaches or solutions. Projects can be individual and in group.

**Semester projects** – are the projects carried out by students (usually in the group) during a semester. These projects may have inter-disciplinary character (may refer to two or more disciplines studied during the same semester).

**Group/team work** – is the joint work of a group of 4-5 students to perform a single task, which is based on communication, collaboration and self-discipline, each member of the group contributing to the achievement of the final result.

**Research-based teaching and learning** - the process of transmission and accumulation of knowledge, as well as the creation or development of skills that are based on some research tasks and aims to facilitate the learning (including individual) process of students.

**Research-based teaching** - is the process by which the student is involved in research exercises and is encouraged to reach his/her own conclusions and solutions using the results of the research carried out.

**Sustainability strategy** – is a long-term vision of an institution aimed at introducing key modifications in order to streamline the teaching-learning process. The strategy includes objectives and concrete actions, the deadline for achievement, as well as the potential outcomes that can be achieved.

*(a) the path from a pilot programme to a comprehensive study programme based on problem-based learning (PBL)* - the concrete steps to introduce PBL in a study programme

*(b) support and promotion of PBL for teaching and learning* - performing information and training measures about the advantages and efficiency of PBL.

**Credit (ECTS)** – the credit is a conventional unit used to calculate the workload performed by the student within a determined time period to achieve certain outcomes and competences. The credit is a tool to ensure the quality of the training.

**ECTS** (European Credit Transfer and Accumulation System) - European system of accumulation and transfer of credits. The Bachelor's degree studies correspond to 180-240 of transferable study credits, with 30 credits per semester.

**Profile degree** – the educational framework to be known by graduates in order to obtain the title of Bachelor, Master.

**Professional development** – opportunities offered to the teacher to strengthen their pedagogical skills, competences and approaches; continuous improvement of staff through trainings, internships, etc.

**Facilitator** – the person who helps a group of students understand their common goals and helps them plan how to achieve the objectives set out in the joint project.

**Internship placement (training/practice)** – institution/organization where students will conduct internship/training.

**Quality assurance** – a systematic monitoring and evaluation programme of the different aspects of a project in order to ensure compliance with quality standards.

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# 1 INTRODUCTION

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The aim of this Work Package – WP5 – is to develop a sustainability strategy for student centred and active based teaching and learning at Nicolae Testemitanu State University of Medicine and Pharmacy and PBL implementing at Nicolae Testemitanu State University of Medicine and Pharmacy. This report will propose an innovative, PBL based BSs study programme in Optometry, a road map and a detailed action plan that will guide university management staff in their efforts to implement PBL, student centred and active based teaching and learning at the mentioned study programme across the university.

This report we draw on WP2 and WP3 was developed during 2015-2017. We also draw on the experience we accumulated during our study visits and staff mobility to the EU partner universities, as well as during PBL training sessions that were offered by the EU project partners in Chisinau.

## 1.1 KEY ASSUMPTIONS

There is no fit-all-purpose PBL-model. However, PBL – models are founded on two assumptions. The First is that the process should be student centred and designed to equip learners with knowledge, understanding and ability to implement their knowledge and understanding to achieve this PBL uses project work as its core, consisting of problem discovery and analysis, solving and reporting (Figure 1). The second is that the other, learning (face-to-face) activities such as literature [private/individual study/learning], lectures, group studies, and tutorials are designed to support the project work. These two assumptions are the foundation of our PBL, student centred and active based teaching and learning BSc study programme in Optometry.

This program is similar to the European higher education curricula and its structure is compatible with that of the curricula of the universities of the European Union. In addition, the program meets the requirements of the European Diploma in Optometry. Based on the Euroasia project CPEA-2015/10066 “Moldova – Norwegian collaboration program in optometry. Enhancing primary eye health care in Moldova” and the interuniversity collaboration between USMF "Nicolae Testemitanu" and the University of South-East Norway, the program of studies in the specialty of Optometry within the USMF "Nicolae Testemitanu" was initiated. The curriculum focuses on the defining components and, in the end, will ensure the achievement of a competence-based and student-centered education.

The Optometry Study Program is a recently launched (second year) program that allows us more opportunities:

1. The study program is an innovative one in medical university studies and is attractive for those who graduated high school in terms of future opportunities through the possibility of developing entrepreneurship (private practice).
2. Easier introduction of new study methods.
3. Flexibility in implementing changes

4. The design of the Optometry study program is conceived on the basis of the similar Optometry program in the South-Eastern University of Norway.

**Strengths:**

1. The expected number of admitted students is about 30, which allows for major flexibility in the logistics operation of the program.
2. The small number of students per group corresponds perfectly to the student's operational needs.
3. The modular type of the study program structure will be introduced from the second year of training.
4. Technical and material endowment of the program with the best technologies in the field (thanks to the support of Norway).

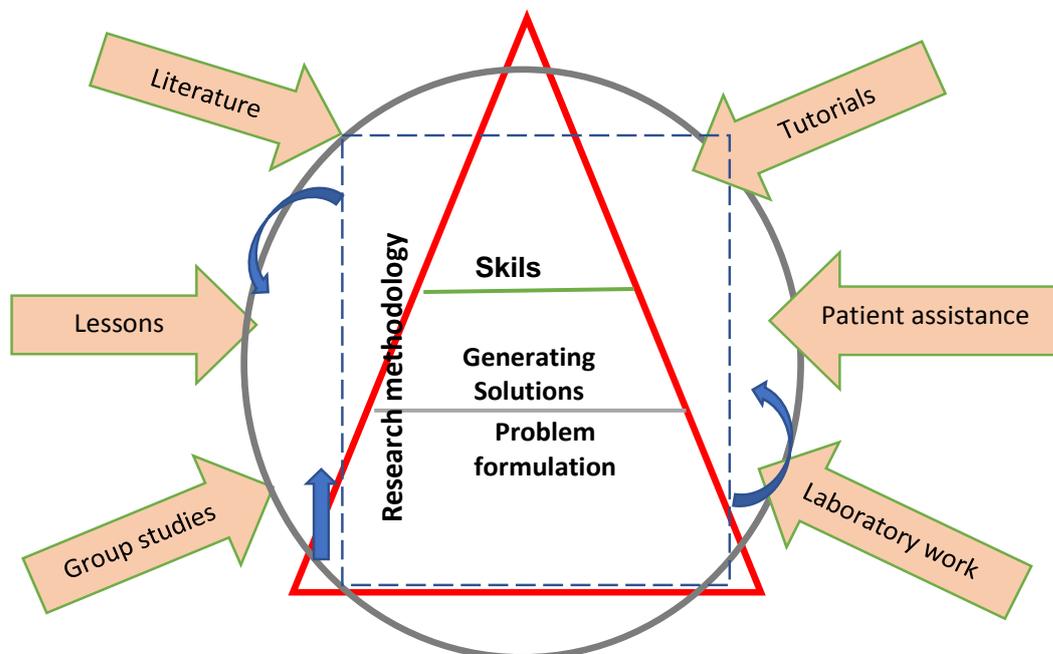
**Weaknesses:**

1. Low experience of the academic staff in the field of Optometry (lack of a precedent).
2. Exodus of academic staff from the medical system.
3. Reducing number of graduating school in the country (decrease in birth rates, negative natural growth and emigration).

**Barriers**

1. Insufficient capacity of staff involved in program management.
2. Resistance to change.
3. Specific socio-cultural background.

**Figure 1: The PBL model for Optometric programe, USMF**



## **LEGEND of the PBL model for USMF "Nicolae Testemitanu"**

The proposed model is based on the AAU PBL model of the University of Aalborg and adapted to the realities, peculiarities and challenges of the medical training program within the USMF "Nicolae Testemitanu". The expected result of any process of university education and training require sustainable medical skills. Thus, the concept of the pyramid structure was used, where the apex of the pyramid is the competency / end result of any training process, the basis of the pyramid being the formulation of the problem and the analysis of the situation, supplemented by the methodology of the research, and its means of generating solutions. Process flow within the pyramid takes place from bottom up to the apex. And competences in research methodology are applied at all levels of competency training. The pyramid of the skill acquisition process is thus placed in the continuous cyclical context of standard academic activities such as theoretical courses, lessons and lectures, group studies, literature review, laboratory activities, tutorials and patient assistance. The evolution of the process of study flows gradually into the form of spirals / spheres in continuous motion.

Another hypothesis relates to the relationship between work on the project and didactic direct contact activities. In the context of this report, a study program, totally based on PBL, is the program where there is a 50:50 sharing between student work on the project and direct contact activities (lectures, seminars, workshops, laboratory work and experiments). At USMF "Nicolae Testemitanu", the sharing of work time on the project and the direct contact activities for the Optometry program is 50:50, according to the model presented in 2016 in the framework of the PBLMD project by Louise Faber, University Associate Professor at Aalborg University (Figure 2 ).

The PBL model of the Optometry study program was developed based on the experience of piloting the PBL model of the "Neuroscience" course.

The "Neuroscience" multidisciplinary course was developed as a pilot program based on the Neurology discipline curriculum and adapted to the requirements of the PBL training model in order to study the physiological and pathological changes of the nervous system according to the neural link between the neural substrate and the causal factor, structure and internal organization of the nervous system, revealing the laws of syndromology and topical diagnosis.

The PBL "Neuroscience" course was aligned to the objectives:

1. *The Development Strategy of USMF "Nicolae Testemitanu" for 2011-2020;*
2. *The Regulation on organization of studies in higher education based on the National Credit Studies System at the State University of Medicine and Pharmacy "Nicolae Testemitanu" of the Republic of Moldova, approved by the minutes of the Senate session USMF, no. 1/8 of 06.04.2017;*
3. *Quality Management System ISO 9001:2015 regarding the development of educational activities in the University*

The didactic activities related to the curriculum of the PBL "Neuroscience" course were structured in accordance with the study plans of the integrated subjects in the respective course, with application of student centered education.

The PBL model at the University of Aalborg, with the modification proposed by Romeo V. Turcan in 2017, was adapted to the requirements of the educational program in the Public Health

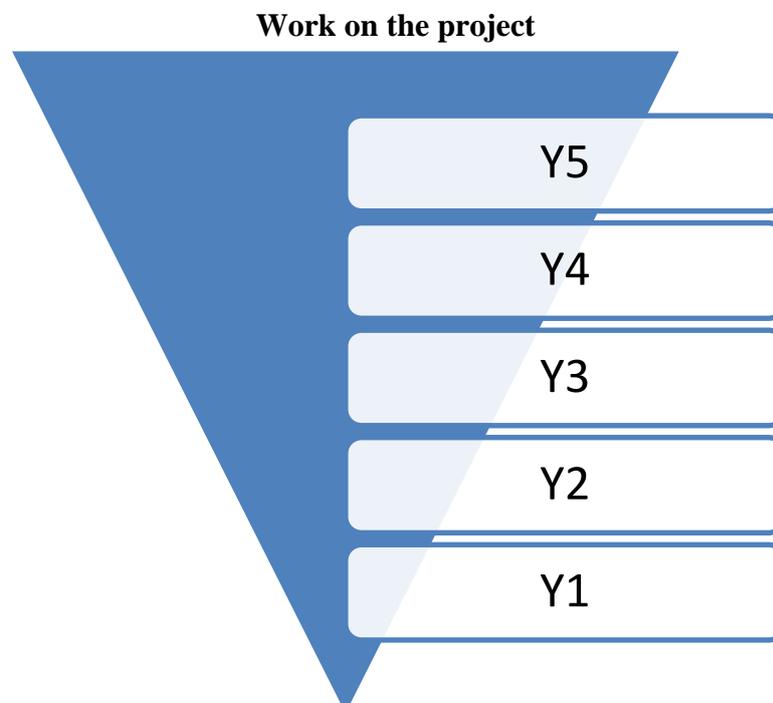
specialty for the "Neuroscience" course. The multidisciplinary "Neuroscience" course was developed for the third year and is scheduled for a full-term semester.

This course has been developed in accordance with the PBL teaching and learning requirements and methodology, so the distinctive and specific elements of the course refer to the training of competences and practical skills characteristic for problem-based education and includes the following components:

- student centered educational activities;
- developing team work skills;
- stimulating creativity;
- development of critical and clinical thinking;
- integrating disciplines to solve problems and case studies;
- developing practical dexterity;
- developing cooperative skills in unpredictable and stressful situations;
- student's freedom in decision-making;
- taking responsibility in actions;
- application of knowledge and dexterity in medical practice.

The workload of the student for the successful acquisition of the Neuroscience course was estimated in accordance with the 50:50 time sharing model of the project and 50:50 direct contact activities, presented in 2016 by the PBLMD project by Louise Faber, associate professor at the University of Aalborg (Figure 2).

**Figure 2. Project distribution of working hours and the direct contact activities**



Source: Louise Faber, PBLMD 2016

The use of the PBL-based training methodology, with the application of modern learning principles, favors students' progress and ability to participate in professional training, including

medical research, geared to the development of the theoretical and practical skills required for a Graduate and a successful employment.

The course "Neuroscience" was attended by 28 students, who are studying at the Public Health specialty of the Medical Faculty No. 1 of the USMF "Nicolae Testemitanu". The lectures were held interactively with the use of IT equipment, and later distributed to students via email or on stik. At practical hours the students were divided into 4 groups of 7 people.

The process of preparing students for the case study and other components of the training process was conducted by 4 facilitators who were trained in mobility at EU partner universities, in particular at the University of Aalborg, by PBL experts. At the same time, the facilitators also gained experience in the familiarization sessions with the PBL training methodology developed in the Republic of Moldova by the project partners.

**Table 1. Study Plan for Public Health Program, the third year, semester VI**

THIRD YEAR, semester VI (17 weeks)									
		Total	Direct contact	Individual study	Course	Practical work	Seminar		ECTS
S.06.O.046	Internal diseases - Semiology	150	85	65	34	30	21	E	4
S.06.O.047	Surgical-Semiology Diseases	120	68	52	17	30	21	E	4
S.06.O.048	Radiation hygiene	120	68	52	17	30	21	E	4
<b>S.06.O.049</b>	<b>Neuroscience</b>	<b>120</b>	<b>68</b>	<b>52</b>	<b>17</b>	<b>30</b>	21	CD	4
S.06.O.050	Radiology and imaging	90	51	39	17	17	17	CD	4
S.06.O.051	Traumatology and orthopedics	120	68	52	17	30	21	CD	
S.06.O.052	Placement learning* Internship	150	120	30		120	-	E	5

Upon implementation of the Neuroscience course, direct contact time amounted to 56.6% and the individual study 43.4%. The insignificant prevalence of direct contact hours results from the need to strengthen practical dexterity.

**Table 2. The "Neuroscience" course timetable**

Day/ Date	Time	Office	Lecture	Case	Manual dexterities	Consultation session	colloquy
February 8	08.00 – 09.40	Neurology	Introduction in PBL				
	09.50 – 11.30	Neurology	Anatomy				
February 15	08.00 – 09.40	Neurology	Morphopatology				
	09.50 – 11.30	Neurology	Fiziology				
February 22	08.00 – 09.40	Neurology	Microbiology				
	09.50 – 11.30	Neurology		Case no. 1			
March 1	08.00 – 09.40	Neurology	Pathophysiology				
	09.50 – 11.30	Neurology		Case no. 1			
March 15	08.00 – 09.40	Neurology	Neurology				
	09.50 – 11.30	Neurology	Psychiatrics				
March 22	08.00 – 09.40	Neurology			Manual dexterities (Case no. 1)		
	09.50 – 11.30	Neurology	Genetics				
March 29	08.00 – 09.40	Neurology		Case no. 2			
	09.50 – 11.30	Neurology	Anatomy + Imagistics				
April 5	08.00 – 09.40	Neurology		Case no. 2			
	09.50 – 11.30	Neurology	Histology				
April 12	08.00 – 09.40	Neurology			Manual dexterities (Case no. 2)		
	09.50 – 11.30	Neurology		Case no. 3			
April 19	08.00 – 09.40	Neurology				Consultation session	
	09.50 – 11.30	Neurology		Case no. 3			
April 26	08.00 – 09.40	Neurology	Biochemistry				
	09.50 – 11.30	Neurology			Manual dexterities (Case no. 3)		
May 10	08.00 – 09.40	Neurology	Pathophysiology				
	09.50 – 11.30	Neurology		Case no. 4			
May 17	08.00 – 09.40	Neurology	Psychiatrics				
	09.50 – 11.30	Neurology		Case no. 4			
May 24	08.00 – 09.40	Neurology	Neurology				
	09.50 – 11.30	Neurology			Manual dexterities (Case no. 4)		
May 31	08.00 – 09.40	Neurology	Psychiatrics				
	09.50 – 11.30	Neurology				Consultation session	
June 7	08.00 – 09.40						colloquy
	09.50 – 11.30						colloquy

From the total number of hours distributed for the Neuroscience course, 17 hours were allocated to the lecturing of the theoretical tangential courses of the given subject, while the rest of the hours were allocated to the studies of 4 clinical cases (12 hours / case). The distribution of theoretical courses was based on the principle of predominance of neuro subjects (physiology, pathophysiology, neurology, psychiatry) versus fundamental sciences (anatomy, histology, microbiology, genetics). The respected proportion was 2:1. This allowed an academic focus on skills in neuroscience.

The course finished with a colloquium that included two components:

1. Patient's Observation Sheet presentation
2. Pass an oral test exam.

Recorded results

The evaluation of the Neuroscience course allowed the quantification of the following knowledge, skills and competences:

*At the level of knowledge and understanding the student:*

- defines the theoretical basis of contemporary neurology
- identifies the anatomic-functional features of the nervous system;
- topographically highlights the place and the significance of different structures, formations and areas of the nervous system in performing concrete functions and neurological syndromes as a whole;
- establishes topical diagnosis based on defined clinical syndromes;

- knows the etiopathogenesis, clinical manifestations, diagnosis, treatment principles and prophylaxis of neurological diseases.

*At application level:*

- performs the collection of anamnesis and evaluation of data on nervous system functions;
- performs the special neurological examination on systems;
- applies the diagnostic methods for neurological diseases;
- knows how to interpret the results of clinical trials and tests, additional investigations of diagnosis for assessing the functional state of the nervous system;
- applies patient examination methods in emergency situations.

*At the integration level*

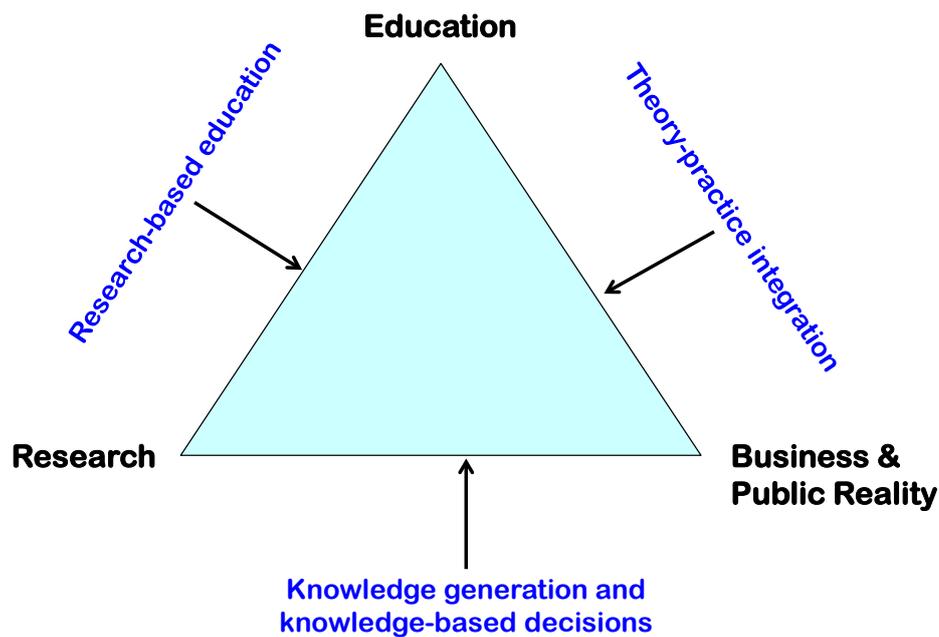
- appreciates the importance of neurology in the context of Medicine and integration with related medical disciplines;
- knows the evolution of physiological processes and the etiology of the pathological processes of the nervous system;
- uses the methods of investigation, treatment and prophylaxis of nervous system diseases;
- interprets the results of diagnostic methods in neurological diseases;
- is able to make optimal decisions in providing emergency aid in critical situations;
- generates ideas for scientific research projects in the field of neurology.

## **1.2 EXPECTED OUTCOMES**

A number of outcomes are envisaged as a result of successful implementation of the PBL, student centred and active based BSc programme in Neurosciences. It is expected that by 2022 this programme will have become an internationally recognized programme that will attract European and international students, such as degree and exchange students. It is also expected that by 2022 at least five /three (Public Health/ AMP/PMA and Optometry) BSc study programmes from our university will have been redesigned based on PBL, student centred and active teaching and learning methodologies and methods and prospect students will have been enrolled in these programmes from September 1, 2020. A better alignment of knowledge, skills, and abilities of the students to the labour markets is envisaged.

Successful implementation of the study programme as well as its spill-over effects throughout our university will contribute to the development and strengthening of the integration of education, research, and business/policy collaboration (Figure 3). Academic staff will excel in engaging in research-based teaching, our students will learn and be able to apply theories in practice, be this in private or public sectors, and our researchers will collaborate with private and public organizations to create and transfer new knowledge.

**Figure 3: Socially engaged university.**



Source: Olav J. Sorensen, 2015

### **1.3 REPORT OUTLINE**

We start the report by presenting our *visionary* PBL-based BSc in Optometry. Specifically we will start with a needs analysis; objective of the programme; general description of the study programme, its learning objectives and outcomes, potential future employment and further study of graduates, then a presentation of each semester, including its learning objectives and learning outcomes. Assessment and assessment criteria, progression from one semester to another, description of project work and semester projects, incl., their learning objectives, outcomes assessment and progression. Thereafter we will present the road map that will guide Nicolae Testemitanu State University of Medicine and Pharmacy in the process of implementing our visionary PBL-based BSc in Optometry. We will continue by presenting and discussing the action plan that will detail e.g., specific activities, resources, and internal policies needed to successfully implement our visionary study programme. We will conclude by providing to the University Management and the University Board a set of policy recommendations on how to enhance our learning and teaching by introducing PBL, student centered and active based teaching and learning methodologies and methods at our university.

## 2 LESSONS LEARNED FROM DEVELOPING AND IMPLEMENTING THE PILOT-PBL-BASED STUDY PROGRAMME

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The implementation of the project at the USMF "Nicolae Testemitanu" started with a pilot program - the multidisciplinary interdisciplinary course of "Neuroscience". This course was developed and implemented for the third year students, semester VI, the Public Health specialty of the Faculty of Medicine no.1, ending with - a differentiated colloquy.

The whole process, from the moment the course concept was formulated to the post-implementation evaluation, generated a series of very precious experiences for the institutional long term development of the University, namely:

1. Resistance to change requires a multidisciplinary approach to all decisional levels. In our case, management of change with a strong focus on communication was a key element, absolutely indispensable for all stages from concept generation to implementation. The fear of leaving the comfort zone, insufficient skills to work in multidisciplinary teams, confusion about the concept of interdisciplinarity were registered at all stages of development and implementation of the "Neuroscience" course. All barriers and their consequences have been overcome mainly by improving communication.
2. Awareness of the need for change is successful only in the bottom-up approach when the need for change is prioritized at the hierarchically superior levels of the institution. In the case of PBL implementation, a consensus has not been achieved with reference to the need to implement new teaching models. This has delayed the continuity of the implementation of the "Neuroscience" course. As a result, any initiative involved the debut of the de novo "plan-do-check-act" cycle.
3. The change was, however, relatively easily accepted by students and trainers, who noticed the advantages of the new methodology almost instantly. Obviously, there was little flexibility in accepting the new methodology, low self-organization and self-expression skills, low teamwork skills, insufficient competence of methodology research, confusion with reference to the interdisciplinary concept, difficulties in prioritizing subjects with low research and communication skills, etc. But the openness to knowledge, the emphasis on communication and the marked flexibility of the young generation have made it possible to quickly overcome all the obstacles.
4. International good practices mention the sustainability marked in the framework of the progressively implemented reform. The implementation of PBL in the USMF started with a course in the study program, targeting a small number of involved students. It started from the premise: "small number - easy management" but also increased possibilities for applying the interdisciplinary approach to the Public Health program. There were registered the following difficulties:
  - Logistics management of the course;
  - Difficulties in the equitable distribution of hours;
  - Logical synchronization of the presented material;
  - Ensuring the continuity of the course idea;

- Implementing the course schedule in the university specific timetable;
- Difficulties in prioritizing selected topics for clinical cases;
- Insufficient skills in case formulation, etc.

At the end of the Neuroscience course students were unanymously surveyed on the quality of teaching and the achievement of the course objectives, with the satisfaction of the beneficiaries being 86% (figure 4)

**Figure 4. Satisfaction of the beneficiaries with regard to the quality of teaching**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1		FCP 9.1.2 FIȘĂ DE ÎNREGISTRARE A CALITĂȚII PREDĂRII																				03	
2																						30.11.2017	
3	Denumire Disciplină: <b>Modulul Neuroștiințe</b>																						
4	Cadrul didactic evaluat:																						
5	<b>Evaluarea cadrului didactic - Modulul Neuroștiințe</b>																						
6		Nr. întrebare																			Nivel de satisfacție pe		
7	Nr. Chestionar	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total		
8	1	3	3	3	4	3	3	4	3	3	3	4	3	3	3	4	3	3	3	3	3	61	80%
9	2	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	56	74%
10	3	3	3	3	4	3	3	3	4	3	3	3	3	4	3	3	4	3	3	3	3	61	80%
11	4	3	3	2	3	3	3	2	3	3	3	3	3	4	3	3	3	4	3	3	3	57	75%
12	5	2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3	54	71%
13	6	3	4	4	3	3	4	4	3	4	3	4	3	4	3	3	4	4	4	4	3	67	88%
14	7	3	4	4	3	3	4	4	3	3	3	4	3	3	2	4	3	4	3	4	4	64	84%
15	8	4	4	3	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	74	97%
16	9	3	3	2	3	3	2	3	3	3	3	3	3	2	2	3	3	3	3	3	3	53	70%
17	10	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	76	100%
18	11	4	4	4	4	4	4	4	4	4	4	3	4	3	3	4	4	4	4	4	4	73	96%
19	12	3	3	4	4	3	4	4	3	4	4	3	3	4	4	4	3	4	4	4	4	69	91%
20	13	3	4	3	4	4	3	4	3	4	3	3	3	4	3	3	4	4	3	4	4	66	87%
21	14	4	4	3	3	3	3	3	3	3	3	3	3	3	2	3	4	3	3	4	4	60	79%
22	15	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	3	3	3	4	4	71	93%
23	16	3	3	4	4	4	4	3	3	3	3	4	3	3	4	4	4	4	3	4	4	67	88%
24	17	4	4	3	4	4	3	3	4	4	3	3	4	3	4	3	4	3	3	4	4	67	88%
25	18	4	3	3	4	3	4	3	4	4	3	3	3	3	4	4	3	4	3	4	4	66	87%
26	19	3	4	4	3	3	4	4	4	2	2	4	4	4	4	4	4	4	4	4	4	69	91%
27	20	4	3	3	3	4	4	3	3	3	4	3	4	4	3	3	3	4	3	4	4	65	86%
28	21	4	3	3	3	3	3	3	4	3	3	3	4	3	4	4	2	3	2	4	4	61	80%
29	22	3	4	4	3	3	2	3	4	3	3	3	4	3	3	4	4	3	4	3	4	63	83%
30	23	4	3	4	4	3	4	3	3	4	4	4	4	4	2	3	3	3	3	4	4	66	87%
31	24	4	3	4	3	4	4	4	4	4	4	4	3	4	2	4	4	4	4	4	4	71	93%
32	25	3	4	3	4	3	4	4	3	3	2	2	2	3	3	3	4	4	3	3	3	60	79%
33	26	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	76	100%
34																							
35	Nivel de satisfacție pe întrebare	3,3	3	3,4	4	3,4	4	4	3,6	4	3,5	4	4	4	4	4	4	4,1	3,9	3,6	65		
36																							
37		Nivel mediu de satisfacție:																			86%		
38																							
39	Data:																						
40	Semnătura responsabilului																						
41																							

### FCP 9.1.2 Registration form for quality of teaching assessment

Subject name: Neuroscience module

The evaluated teacher:

Teacher's evaluation - Neuroscience module

Question nr.

Nr. Questionnaire

Level of satisfaction / Level of satisfaction per question / average level of satisfaction / Date:

/ Signature of the responsible person

Taking into account the results of post-implementation feedback, we wanted to extend the experience to a full-time program. In this context, the Optometry program, in its second year of implementation, is one that is suited to the sustainability of the project.

The challenges recorded in the internal validation process of the "Neuroscience" course are reflected in (Table 3).

**Table 3. Achievement of the action plan within the "Neuroscience"**

	<b>OBC 5.1</b>			RED: 03
	<b>THE IMPLEMENTATION OF THE ACTIVITIES PLAN OF THE "NEUROSCIENCE" COURSE</b>			Pag.
<b>2018</b>				
<b>Specific objectives</b>	<b>Activities</b>	<b>Responsible for implementation</b>	<b>Performance indicators</b>	<b>Notes</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>I. Achieving the student-centered curricular reform aimed at acquiring the necessary skills in the professional activity, in accordance with the national and international standards.</b>	1. Periodic evaluation of the study program and its compatibility with the European PBL programs.	Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1	1.1. Initial report of the Curriculum Reform Commission. 1.2. Coherence degree of the study program estimated according to the annual questionnaire of the trainees <b>of at least 75%</b> .	1.1 Achieved 1.2 Achieved

	1. Compatibility of the PBL study program based on ECTS with those of the European partner medical universities of the project to individualize the educational path of each student, ensuring student mobility.	Vice-rector on quality Vice-rector on international students ✓ DDMA Deans FM1	1.1. Number of students who have benefited from mobility of <b>at least 4</b> .	2.1 Achieved
	2. Optimize the ratio of direct contact hours (lectures and practical tests) and individual work, group work, and project work.	Vice-rector on quality Vice-rector on international students ✓ DDMA Deans FM1	1.1. Sharing time between student work on the project and direct contact activities of <b>at least 50:50</b> .	3.1 Achieved
<b>II. Continuously improve the quality of admission, training and assessment processes for students.</b>	1. Implement modern methods and techniques of training, based on clinical case and problem.	Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1	1.1 Number of teachers trained with PBL methods and techniques <b>min ____14__</b> . 1.2 Number of teachers applying modern methods, according to the results of questionnaires of <b>min ____14__ students</b> .	1.1. Achieved  1..2 Achieved
	1. Ensure the transparency of the competence assessment process by publishing the results in the Intranet.	Vice-rector on quality Vice-rector on international students ✓ DDMA Deans FM1 ✓ DTIC	2.1 Number of facilitators who placed on the Intranet the results of evaluating the students' knowledge and practical skills <b>of 100%</b> .	2.1 Achieved  - the results were placed in the SIMU

	1. Systematic questioning (at the end of the course) of the students regarding the quality of the PBL didactic process.	Vice-rector on quality Vice-rector on international students ✓ DDMA Deans FM1	3.1 Number of students undergoing systematic questioning of <b>at least 75%</b> .  3.2 Number of facilitators who practice systematic questioning of the students regarding the quality of the didactic process of <b>at least 4</b>	3.1 Interviewed 26 Stud. - 92.86%  3.2 Achieved
<b>III. Promoting the PBL Program in the University and among high school graduates</b>	4. Editing and distributing promotional materials related to the PBL program.	Vice-rector on quality Vice-rector on International Students Department of Public Relations Admissions Commission	4.1 Number of school graduates enrolled in the program promoted by <b>min 10</b> .	4.1 Achieved In 2018-2019, 25 students.

## 3 OUR VISIONARY PBL-BASED BSC IN OPTOMETRY

### 3.1 AN OVERVIEW

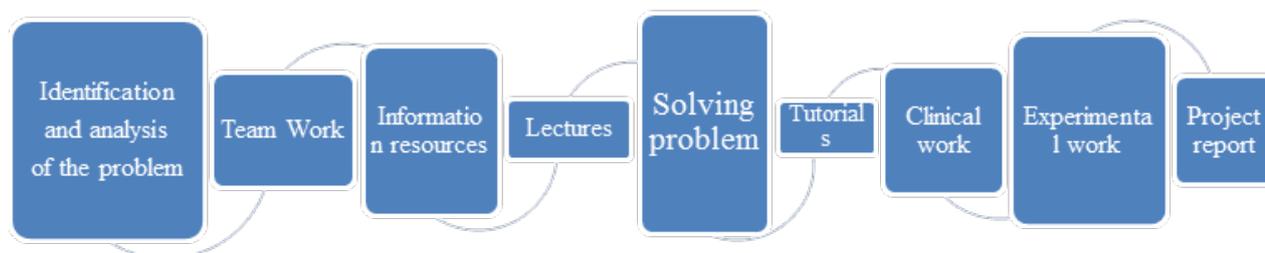
In order to ensure continuity of the PBL model at USMF "Nicolae Testemitanu", the introduction of problem-based education to the Optometry program will be achieved on the experience gained in implementing the multidisciplinary "Neuroscience" course.

The project of the Optometry study program was elaborated in accordance with the objectives of the USMF "Nicolae Testemitanu" Development Strategy for the period 2011-2020, Regulation for organization of studies in higher education based on the National Credit Studies System in the State University of Medicine and Pharmacy "Nicolae Testemitanu" of the Republic of Moldova, approved by the session of the USMF Senate' minute, no. 1/8 of 06.04.2017 and the standards of the Quality Management System ISO 9001: 2015 regarding the development of the educational activities in the University.

The didactic activities were structured in accordance with the provisions of the curriculum of the Optometry program with the application of student centered education.

For the Optometry study program we will continue to use the University of Aalborg PBL model, with the modification proposed by Romeo V. Turcan in 2017, which we will adapt to the peculiarities of the medical higher education in the Republic of Moldova (Figure 5).

**Figure 5.** Structure of activities related to the Optometry study program



The Optometry program is to be implemented during 4 years of study in line with the PBL teaching and learning methodology requirements. The distinctive features of the given program refer to the training of competences and practical skills characteristic for problem-based education and include the following components:

- student centered educational activities;
- developing team work skills;
- stimulating creativity;
- development of critical and clinical thinking;
- integrating disciplines to solve problems and case studies;

- developing practical dexterity;
- developing cooperative skills in unpredictable and stressful situations;
- student's freedom in decision-making;
- taking responsibility in actions;
- developing skills for managing entrepreneurial activity;
- application of knowledge and dexterity in medical practice.

The State University of Medicine and Pharmacy "Nicolae Testemitanu" applies systematic approach to curricular monitoring by elaborating, implementing and improving the efficiency of the training program according to the standards of the Quality Management System ISO 9001: 2015 for the beneficiaries' full satisfaction of their needs. Thus, there is a system of evaluation of the study program that monitors students' curricula and progression, with the identification and subsequent correction of nonconformities.

Curricular monitoring program of the processes and outcomes is ensured by applying the procedures of: assessment of the teaching quality and of teacher's satisfaction, including all the elements necessary to meet the established requirements.

Estimating the student's workload for the successful acquisition of the Optometry program was done in accordance with the 50:50 time sharing model for the project work and direct contact activities, presented in 2016 by the PBLMD project by Louise Faber, associate professor at University of Aalborg.

Problems based learning with application of modern learning principles favors students' progression and ability to participate in professional training activities including research competences aimed at developing both the theoretical and practical abilities necessary to a graduate for a successful integration in the workplace, as well as the application of entrepreneurial practices.

## **3.2 SEMESTERS**

### **3.2.1 Semester 1**

#### **Skills / Competencies developed during the semester:**

1. Apply basic optometric investigation techniques of patients in the professional activity process;
2. Use the basic knowledge in the given field to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific domain, optimally and creatively exploit their own potential in specific situations, with respect for the principles and rules of professional ethics;
5. Apply group relationship techniques; developing empathetic empowerment of interpersonal communication and assuming specific roles in teamwork;

6. Objective self-evaluation of the need for continuous professional training, Identification of opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of information and communication technologies, through correlation with the needs and professional development facilities specific to optometry.

Unit name course/module	Total hours			Nr. hours by type of activity			Form of evaluation	Nr. credits
	Total	Direct contact	Indivi dual Study	Course	Practic al work	Seminar		
<b>FIRST YEAR, I Semester (15 weeks)</b>								
<b>Compulsory subjects (C)</b>								
Anatomy of man	120	60	60	30	20	10	E	4
Optical Physics	150	75	75	30	20	25	E	5
Histology, cytology, embryology	120	60	60	30	20	10	E	4
English / French	120	60	60	-	-	60	E	4
Superior mathematics	120	60	60	30	20	10	E	4
Fundamental optometry	150	75	75	30	20	25	E	5
<b>Total compulsory subjects</b>	<b>780</b>	<b>390</b>	<b>390</b>	<b>150</b>	<b>100</b>	<b>140</b>	<b>6E</b>	<b>26</b>
<b>Optional subjects (O) Package I</b>								
<i>Anthropology and philosophy in medicine</i>	<b>120</b>	<b>60</b>	<b>60</b>	<b>30</b>	<b>-</b>	<b>30</b>	<b>E</b>	<b>4</b>
<i>Introductory University Course (Information Technologies; History of the specialty; Basics of Information Culture)</i>								
<b>Total first curricular semester</b>	<b>900</b>	<b>450</b>	<b>450</b>	<b>180</b>	<b>100</b>	<b>170</b>	<b>7E</b>	<b>30</b>

The teaching-learning methods used are student-centered and research-centered. Teachers are involved in many scientific-teaching activities using various teaching-learning interactive forms, including discussion, making current assessments, verification of reviews, reports, portfolios, case studies, patient observation sheets prepared by students, etc. The curriculum provides student-centered training, and at the end of each academic year the students defend a mini-project they have worked on during the semester. While planning the academic subjects, special attention is drawn to the realization and evaluation of the students' individual work. The students' opinions concerning the organization of the didactic process, the technical-material means, the content of certain subjects are taken into consideration and are appreciated according to the results of the survey applied in the SIMU. Individual support to students is provided through individual consultations at each studied subject and individual work management (the mini-project).

### **Evaluation methods:**

The process and the assessment forms of the learning outcomes are carried out in strict compliance with the provisions of the normative acts in the field, namely: the Regulation for evaluation and academic performance, Regulation on the organization of the graduation exam of higher education integrated within the USMF. At the same time, the evaluation activity is also reflected in the curricula of the study subjects. The current assessment procedure for student learning activity is carried out during the educational process in the framework of the courses, seminars, practical activities (laboratory classes), consultations, individual work assigned to each student by oral evaluation, testing, written papers, practical activities, clinical case study, reports and the mini project.

The evaluation strategy is determined by the study program goals and aims at ascertainment / assessment of the formed competencies. It is elaborated by the faculty chair (for each department and subject) with the participation of the University's Evaluation Center and the faculty departments. In order to increase the degree of objectivity and transparency of the evaluation process, current assessments and screening sessions, at the Senate's decision, can be carried out by means of information technologies - assisted computer programs by tests. The results of the final evaluation are expressed in marks according to the scoring scale (minimum mark for promotion is grade 5) and study credits. The number of academic credits is determined by the curriculum and evaluates the full realization of the workload claimed out by the student, which proves the acquirement of certain competences. The final grade in the discipline is calculated from the average results for current assessments (50%) and the mark obtained on the exam (50%). The exam is considered to be passed if the student has received a promotion mark. If the exam consists of several stages, it will be considered to be passed if all stages are promoted, with a minimum promotion mark. Teachers indicate the results of the final evaluation in the scoring border, which is printed in the SIMU.

### **Expected outcomes**

- Know the inspection procedures of the eyeball and the annexes;
- Know the eyeball investigation techniques and annexes;
- Know and be able to differentiate the normal and abnormal findings of the eyeball and the annexes;
- Know the construction, adjustment and use of various equipment and instruments for investigation in optometry;

- Know how to use different instruments for an eye inspection and explain the findings;
- Know to perform a basic examination of the anterior segment of the eyeball by biomicroscopy;
- Know to perform a basic examination of the posterior segment of the eyeball by direct and indirect ophthalmoscopy;
- Know how to make simple measurements of corneal curvature;
- Know how to use diagnostic drug remedies for the examination of the eye posterior segment;
- Be aware of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity;
- Perform a fundamental examination of the eye and its annexes using the tools included in the course (direct and indirect ophthalmoscope, biomicroscope, keratometer, retinoscope);
- Be able to evaluate and record the basic outcomes of the examinations used in the course.

### **3.2.2 Semester 2**

#### **Competences acquired during the course:**

1. Applying the theories of visual and physical optics and visual neurophysiology;
2. Use the basic knowledge in the given domain to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific domain, optimally and creatively exploit its potential in specific situations, with respect to the principles and norms of professional ethics;
5. Apply group relationship techniques; developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
6. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

Unit name course/module	Total hours			Nr. hours by type of activity			Form of evaluation	Nr. credits
	Total	Direct contact	Indivi dual studies	Course	Practic al work	Seminar		
<b>YEAR I, Semester II (15 weeks)</b>								
<b>Compulsory subjects (C)</b>								
Anatomy of the eye	180	90	90	30	30	30	E	6
Biochemistry	120	60	60	30	20	10	E	4
Geometry, Visual Optics and assembling optical products	120	60	60	30	20	10	E	4
Research methodology	120	60	60	30	20	10	E	4
Fundamental methods of investigation in optometry	120	60	60	30	20	10	E	4
Mini project	120	60	60	-	60	-	E	4
<b>Total compulsory subjects</b>	<b>780</b>	<b>390</b>	<b>390</b>	<b>150</b>	<b>100</b>	<b>140</b>	<b>6E</b>	<b>26</b>
<b>Optional subjects (O)                      Package II</b>								
<i>History of medicine</i>	<b>120</b>	<b>60</b>	<b>60</b>	<b>30</b>	<b>-</b>	<b>30</b>	<b>E</b>	<b>4</b>
<i>History of illustrious medical scholars</i>								
<b>Total curriculum semester II</b>	<b>900</b>	<b>450</b>	<b>450</b>	<b>180</b>	<b>100</b>	<b>170</b>	<b>7E</b>	<b>30</b>
<b>Compulsory extracurricular subjects (OE)</b>								
Physical education	30	30	-	-	30	-	C	-

The teaching-learning methods used are student-centered and research-centered. Teachers are involved in many didactic-scientific activities with the use of various interactive forms of teaching-learning, including discussions, making current assessments, verification of reviews, reports,

portfolios, case studies, the patient's observation sheet prepared by the students, etc. The curriculum provides student-centered training, and at the end of each academic year the students defend a mini-project they worked on during the semester. While planning the academic subjects, special attention is drawn to the realization and evaluation of the students' individual work. The students' opinions concerning the organization of the didactic process, the technical-material means, the content of certain subjects are taken into consideration and are appreciated according to the results of the survey applied in the SIMU. Individual support to students is provided through individual consultations at each studied subject and individual work management (the mini-project).

### **Evaluation methods:**

The process and the forms of assessment of the learning outcomes are carried out in strict compliance with the provisions of the normative acts in the field, namely: the Regulation for evaluation and academic performance, Regulation on the organization of the graduation exam of higher education integrated within the USMF. At the same time, the evaluation activity is also reflected in the curricula of the study subjects. The current assessment procedure for student learning activity is carried out during the educational process in the framework of the courses, seminars, practical activities (laboratory classes), consultations, individual work assigned to each student by oral evaluation, testing, written papers, practical activities, clinical case study, reports and the mini project.

The evaluation strategy is determined by the study program goals and aims at ascertainment / assessment of the formed competencies. It is elaborated by the faculty chair (for each department and subject) with the participation of the University's Evaluation Center and the faculty departments. In order to increase the degree of objectivity and transparency of the evaluation process, current assessments and screening sessions, at the Senate's decision, can be carried out by means of information technologies - assisted computer programs by tests. The results of the final evaluation are expressed in marks according to the scoring scale (minimum mark for promotion is grade 5) and study credits. The number of academic credits is determined by the curriculum and evaluates the full realization of the workload claimed out by the student, which proves the acquirement of certain competences. The final grade in the discipline is calculated from the average results for current assessments (50%) and the mark obtained on the exam (50%). The exam is considered to be passed if the student has received a promotion mark. If the exam consists of several stages, it will be considered to be passed if all stages are promoted, with a minimum promotion mark. Teachers indicate the results of the final evaluation in the scoring border, which is printed in the SIMU.

### **Expected outcomes**

- Know the principles of photometry, the spectral perception of ocular media, and the effect of electromagnetic radiation on ocular tissues;
- Explain neurophysiology and organization of visual field and visual cortex;
- Explain the perception of light, shape (spatial perception), space, movement and color of people with normal vision and those with aberrant perceptions;
- Describe in detail the methods and procedures for testing adaptation to darkness, examining visual acuity at high and low contrast, and contrast sensitivity, as well as examining chromatic vision;

- Perform practical light measurements using a luxmeter, and provide adequate illumination conditions;
- Perform clinical testing of adaptation to darkness, visual acuity at high and low contrast, contrast sensitivity and chromatic vision;
- Develop, analyze and form the conclusion of the clinical data performed and describe the normal or abnormal results obtained;
- Recognize their own limits of the knowledge gained in the context of the course;
- Explain the professional and ethical issues in accordance with applicable laws and ethical guidelines for optometrists and other medical staff;
- Be aware of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity;
- Analyze and critically evaluate their own and their colleagues' activity to ensure the quality of the examination.

### **3.2.3 Semester 3**

#### **Competences acquired during the course:**

1. Apply the principles of use and distribution of contact lenses in the process of professional activity;
2. Use the basic knowledge in the given domain to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific domain, optimally and creatively exploit its potential in specific situations with respect to the principles and norms of professional ethics;
5. Apply group relationship techniques; developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
6. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

Unit name course/module	Total hours			Nr. hours by type of activity			Form of evaluation	Nr. credits
	Total	Direct contact	Individual studies	Course	Practical work	Seminar		
<b>YEAR II, Semester III (15 weeks)</b>								
<b>Compulsory subjects (C)</b>								
Physiology of the eye	120	60	60	20	30	10	E	4
General pharmacology	120	60	60	20	20	20	E	4
Visual Optics and Optical Products	180	90	90	30	30	30	E	6
Research methodology	120	60	60	20	20	20	E	4
Microbiology, Virology and Immunology	120	60	60	20	10	30	E	4
Diagnostic methods in optometry	120	60	60	20	20	20	E	4
<b>Total Compulsory subjects</b>	<b>780</b>	<b>390</b>	<b>390</b>	<b>150</b>	<b>100</b>	<b>140</b>	<b>6 E</b>	<b>26</b>
<b>Optional subjects (O) Package II</b>								
<i>Medical Sociology</i>	<b>120</b>	<b>60</b>	<b>60</b>	<b>30</b>	<b>-</b>	<b>30</b>	<b>E</b>	<b>4</b>
<i>Medical psychology</i>								
<b>Total curricular III semester</b>	<b>900</b>	<b>450</b>	<b>450</b>	<b>180</b>	<b>100</b>	<b>170</b>	<b>7 E</b>	<b>30</b>

The teaching-learning methods used are student-centered and research-centered. Teachers are involved in many didactic-scientific activities with the use of various interactive forms of teaching-learning, including discussions; making current assessments, verification of reviews, reports, portfolios, case studies, the patient's observation sheet prepared by the students, etc. The curriculum provides student-centered training, and at the end of each academic year the students defend a mini-project they worked on during the semester. While planning the academic subjects, special attention is drawn to the realization and evaluation of the students' individual work. The students' opinions concerning the organization of the didactic process, the technical-material means, the content of certain subjects are taken into consideration and are appreciated according to the results of the survey applied in the SIMU. Individual support to students is provided through individual consultations at each studied subject and individual work management (the mini-project).

### **Evaluation methods:**

The process and the assessment forms of the learning outcomes are carried out in strict compliance with the provisions of the normative acts in the field, namely: the Regulation for evaluation and academic performance; Regulation on the organization of the graduation exam of higher education integrated within the USMF. At the same time, the evaluation activity is also reflected in the curricula of the study subjects. The current assessment procedure for student learning activity is carried out during the educational process in the framework of the courses, seminars, practical activities (laboratory classes), consultations, individual work assigned to each student by oral evaluation, testing, written papers, practical activities, clinical case study, reports and the mini project.

The evaluation strategy is determined by the study program goals and aims at ascertainment / assessment of the formed competencies. It is elaborated by the faculty chair (for each department and subject) with the participation of the University's Evaluation Center and the faculty departments. In order to increase the degree of objectivity and transparency of the evaluation process, current assessments and screening sessions, at the Senate's decision, can be carried out by means of information technologies - assisted computer programs by tests. The results of the final evaluation are expressed in marks according to the scoring scale (minimum mark for promotion is grade 5) and study credits. The number of academic credits is determined by the curriculum and evaluates the full realization of the workload claimed out by the student, which proves the acquirement of certain competences. The final grade in the discipline is calculated from the average results for current assessments (50%) and the mark obtained on the exam (50%). The exam is considered to be passed if the student has received a promotion mark. If the exam consists of several stages, it will be considered to be passed if all stages are promoted with a minimum promotion mark. Teachers indicate the results of the final evaluation in the scoring border, which is printed in the SIMU.

### **Expected outcomes**

- Know the relevant methods for applying contact lenses;
- Know the procedures for distributing contact lenses;
- Know the possible complications that may occur along the contact lens wearing;
- Know the ocular and systemic pathologies that can endanger the use of contact lenses;
- Know the legislation on contact lenses in the practice of optometrists;
- Can collect an anamnesis for the application of contact lenses;

- Know the technique of examinations and measurements relevant for the application of contact lenses to people of all ages (over 5 years) with normal visual functions;
- Know how to evaluate, analyze and describe the normal and abnormal findings in the previous segment associated with the wear of the contact lenses;
- Know how to request the consultation of other health professionals as appropriate;
- Know to complete a medical file in accordance with the specific instructions and procedures regarding contact lenses;
- Have practical skills on recommending cleaning remedies and measures to prevent complications to contact lens wearers;
- Recognize their own limits on knowledge gained in the context of the course;
- Be aware of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity;
- Analyze and critically evaluate their own and colleagues' activity to ensure the quality of the examination.

### **3.2.4 Semester 4**

#### **Visual perception**

The discipline is intended to provide students with theoretical and practical knowledge in the field of human and binocular vision mechanisms by which they can perform their optometrist function. The students' activities aim at developing critical analysis capacities and integrating the information taught in the individual as well as in the team activity in the field of optometry. It is a discipline that contributes to the development of a clear, logical, articulate and coherent language for an optometrist.

#### **Competences acquired during the course:**

1. Apply the principles of use and distribution of contact lenses in the process of professional activity;
2. Use the basic knowledge in the given domain to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific domain, optimally and creatively exploit its potential in specific situations, with respect to the principles and norms of professional ethics;
5. Apply group relationship techniques; developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
6. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

### **Expected outcomes at the end of the course**

#### **Upon completion of the course the student will be able to:**

1. Know the sensory adaptations in strabismus and recognize the most common types of strabismus;
2. Know the methods of binocular and monocular vision evaluation;
3. Be familiar with methods of investigation and management of adult patients with oculomotor and / or accommodation disorders;
4. Know the methods of investigation and management of children with abnormalities of binocular vision;
5. Understand the management of children at risk of developing an abnormality of binocular vision;
6. Know the management principles of patients with vision abnormalities.

#### **At the application level:**

1. Perform an orthopedic examination by themselves.
2. Identify and implement the necessary prophylaxis and monitoring measures for patients with binocular and / or accommodation problems or at risk of developing binocular vision problems.
3. Evaluate, analyze the results of the examinations and propose a proper monitoring scheme for the patient with ocular disturbances.

#### **At the integration level:**

1. Recognize their own limits on knowledge gained in the context of the course.
2. Be aware of the importance of cooperation with ophthalmologists and specialists in other fields in case of necessity.
3. Analyze and critically evaluate their own and colleagues' activity to ensure the quality of the examination.

**Learning-teaching strategies:** Presentation, interactive lecture, heuristic conversation, demonstration, problem-solving, brainstorming, group work, individual study, work with textbook and the scientific text, learning by examining and presenting clinical cases, debate.

**Assessment strategies:** tests for current assessment, tasks for individual work, oral evaluation, practical skills testing, written test for final assessment.

## **3.2.5 Semester 5**

### **The basics of pediatric optometry**

#### **Competences acquired during the course:**

1. Apply the principles of pediatric optometry in the process of professional activity;
2. Use the basic knowledge in the given field to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;

4. Diagnosis of ocular pathologies and determination of the urgency degree, for patient orientation towards ophthalmologist;
5. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific field, optimally and creatively exploit their own potential in specific situations, with respect to the principles and norms of professional ethics;
6. Applying group relationship techniques, developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
7. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies by correlation to the needs and professional development facilities specific for optometry.

### **Expected outcomes at the end of the course**

#### **Upon completion of the course the student will be able to:**

1. Know the development principles of children's optical analyzer;
2. Know the classification of children's optical analyzer abnormalities;
3. Know the examination methods of visual functions in pediatric optometry;
4. Know the methods of assessment and diagnosis of children's refraction;
5. Know the symptoms of children's refractive anomalies;
6. Know the topical drug remedies in the refractive examination of children;
7. Know and interpret the symptoms and signs of abnormal eye conditions and pathologies that endanger the sight;
8. Know the risk factors for ocular pathologies;
9. Know the specific manifestations of systemic maladies affecting the vision organ.

#### **At application level:**

1. Be able to perform a visual examination of the small patient.
2. Possess the technique of children's retinoscopy.
3. Be able to diagnose a children's refractive abnormality.
4. Be able to apply ophthalmic drops in refractive examination of children.
5. Be able to recommend when necessary the ophthalmologist consultation and provide appropriate counseling to patients.
6. Apply knowledge in practice to prevent ocular pathologies and conditions of occurrence.
7. Know how to apply speciality knowledge and relevant research results for the treatment of the patient with ocular diseases.

#### **At the integration level:**

1. Recognize their own limits on knowledge gained in the context of the course.
2. Be aware of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity.
3. Analyze and critically evaluate their own and colleagues' activity to ensure the quality of the examination.
4. Be aware of the importance of ocular pathologies in the specialty of Optometry.

**Learning-teaching strategies:** Presentation, interactive lecture, heuristic conversation, demonstration, problem-solving, brainstorming, group work, individual study, work with textbook and the scientific text, learning by examining and presenting clinical cases, debate.

**Assessment strategies:** tests for current assessment, tasks for individual work, oral evaluation, practical skills testing, written test for final assessment.

### **3.2.6 Semester 6**

#### **Methods of visual examination and rehabilitation in optometry**

The discipline is intended to provide students with theoretical knowledge, skills and general competences regarding visual function rehabilitation of patients with visual maladies. The students' activities aim at developing the critical analysis capacities and integrating the information taught in their own as well as in the team's activity in the field of optometry. It is a discipline that contributes to the development of a clear, logical, articulate and coherent language, and the knowledge gained will serve as tools for practicing the profession of an optometrist.

#### **Competences acquired during the course:**

1. Apply the principles of visual functions' rehabilitation to persons with disabilities in their professional activity process.
2. Use basic knowledge in the given field to explain and interpret specific algorithms in the professional field;
3. Define basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific domain, optimally and creatively exploit their own potential in specific situations, with respect to the principles and norms of professional ethics;
5. Apply group relationship techniques; developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
6. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

#### **Expected outcomes at the end of the course**

#### **Upon completion of the course the student will be able to:**

1. Know the classifying principles of ocular disabilities.
2. Know the examination methods of people with ocular disabilities.
3. Know the rehabilitation principles of visual functions.
4. Know the types of devices' use to help rehabilitating people with eye disabilities.
5. Know the legislation in force regarding people with ocular disabilities.

**At application level:**

1. Possess the technique of examining people with problems of the vision organ.
2. Know how to test visual aids of the people with eye disabilities.
3. Know how to prepare an application for visual aids assistance.
4. Know to provide advice on the use of such vision equipment as: magnifying glass, binoculars, telescope for people with eye problems.

**At the integration level:**

1. Recognize your own limits on knowledge gained in the context of the course.
2. Be aware of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity.
3. Use the knowledge and skills acquired to improve the quality of life of people with ocular disabilities.
4. Analyze and critically evaluate their own and colleagues' activity to ensure the quality of the examination.

**Learning-teaching strategies:** Presentation, interactive lecture, heuristic conversation, demonstration, problem-solving, brainstorming, group work, individual study, work with textbook and scientific text, learning by examining and presenting clinical cases, debate.

**Assessment strategies:** tests for current assessment, tasks for individual work, oral questionnaire, practical skills testing, written test for final assessment.

### 3.2.7 Semester 7

**Competences acquired during the course:**

1. Application of the principles of use and distribution of contact lenses in the process of professional activity.
2. Use basic knowledge in the given field to explain and interpret specific algorithms in the professional field.
3. Define basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist.
4. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific field, optimally and creatively exploit their own potential in specific situations, with respect to the principles and norms of professional ethics.
5. Apply group relationship techniques, developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork.
6. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

### 3.2.8 Semester 8

#### **Clinical practice (Internship)**

##### **Competences acquired during the course:**

1. Applying the principles of optometry in the process of professional activity;
2. Using the basic knowledge in the given field to explain and interpret specific algorithms in the professional field;
3. Define the basic concepts, theories, methods and principles regarding the collection, processing, analysis and interpretation of the information necessary for the professional activity of the optometrist;
4. Diagnosis of ocular pathologies and determination of the urgency degree, for patient orientation towards ophthalmologist;
5. Apply rigorous and efficient working rules, manifest a responsible attitude towards the scientific field, optimally and creatively exploit their own potential in specific situations, with respect to the principles and norms of professional ethics;
6. Applying group relationship techniques, developing empathetic empowerment of interpersonal communication and assume specific roles in teamwork;
7. Objective self-evaluation of the need for continuous professional training, Identifying opportunities for continuous training and efficient use of learning resources and techniques for self development, efficient use of knowledge in the field of information and communication technologies, by correlation to the needs and professional development facilities specific for optometry.

##### **The research project**

##### **Expected outcomes at the end of the project**

##### **Upon completion of the course unit the student will be able to:**

1. Know the management principles of eyeball diseases and auxiliary eye apparatus;
2. Know and apply the anomalies and maladies classifications of the optical analyzer;
3. Know and apply the examination methods of the functions of the eye organ in optometry;
4. Know and apply the evaluation methods and diagnosis of refraction;
5. Know the symptoms of refraction abnormalities;
6. Know the topical drug remedies in the refractive examination;
7. Know and interpret the symptoms and signs of abnormal eye conditions and pathologies that endanger the sight;
8. Know the risk factors of the ocular pathologies and their management;
9. Know the specific manifestations of systemic maladies that affect the organ of vision and apply effective management.

##### **At application level:**

1. Be able to perform a patient's visual function examination with sight problems.
2. Possess retinoscopy technique for adults and children.
3. Be able to diagnose adults' and children's refractive abnormality.
4. Apply eye drops to the framework of a refractive examination.

5. Be able to recommend the consultation of the ophthalmologist and provide appropriate counseling to patients.
6. Apply knowledge in practice to prevent eye pathologies and conditions of occurrence.
7. Know how to apply speciality knowledge and relevant research results for the treatment of the patient with ocular diseases.

**At the integration level:**

1. Awareness of the importance of cooperation with ophthalmologists and specialists from other fields in case of necessity.
2. Awareness of the importance of ocular pathologies in the Optometry specialty.
3. Analyze and critically evaluate their own and colleagues' activity to ensure the quality of the examination.
4. Apply in the territory the knowledge and dexterity accumulated during the studies.
5. Use modern management techniques with entrepreneurial elements.

**Teaching and learning strategies:** individual study and group work, working with text books and scientific text, learning by examining and investigating clinical cases.

**Assessment strategies:** tasks for individual work, oral evaluation, practical skills testing, presentation of the research project results, final testing at the state examination.

## 4 ROAD MAP

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### 4.1 INTRODUCTION

The implementation of problem-based education in the Optometry program is based on the practice of the Neuroscience course. Analysis of strengths and weaknesses will provide us with the opportunity to improve the quality of student training in the Optometry program.

Thanks to mobility of partner universities in the EU, the academic framework has gained experience on problem-based learning methodology, we have documented the organization of the medical education process and we have learned how to elaborate the stages of the implementation of the study programs and their integration into universities at different hierarchical levels such as: university management, management at faculty level, departments and other university subdivisions.

For the successful implementation of the project objectives, staff and students will be initiated in the PBL method and will prepare the ground for starting the PBL program activities in Optometry.

### 4.2 PERIOD 1

*January-June 2019 - Preparation Phase PBL\_Optometry*

This period coincides with the continuation of the PBL\_Neuroscience course in the Public Health program. This gives a significant advantage to the preparation of the PBL launch within the Optometry program.

#### **Purpose and specific objectives:**

The purpose of the preparatory phase is to fully prepare all the necessary prerequisites for launching the PBL initiative for the Optometry program, namely:

1. Development, customizing and approval at all levels of:
  - PBL used model;
  - Adjustment to PBL curriculum components;
  - Completing the schedule;
  - Development of case studies;
  - Finalizing study objectives and research questions;
  - Compilation of bibliographic lists;
  - Preparing the team of trainers, moderators and project managers.

#### **Expected results:**

1. PBL intervention team trained and prepared to meet the qualifications needed to implement PBL;
2. Complete set of materials for the teaching process;
3. Curriculum and timetable finalized and approved.

### 4.3 PERIOD 2

July - December 2019 Implementation launch of PBL\_Opto

**Purpose and specific objectives:**

The period is to be dedicated to the final preparations and debut of the PBL implementation in the Optometry program. The set of educational material is developed for the 2nd and 3rd year, having as a substrate the modular type of curricular development. Clinical cases prepared according to the pre-established plan will be introduced for studies.

**Expected results:**

1. Design process with minor impediments;
2. PBL team satisfied with the results;
3. Competent and happy students.

### 4.4 PERIOD 3

January-June 2020 Deployment implementation of PBL\_Opto

**Purpose and specific objectives:**

The period is to be dedicated to continuing to apply PBL to prepare Optometrist students and to continue with the clinical cases study according to the pre-established plan. The final result is the research project that integrates all the modules studied, team-prepared by the students.

Expected results:

1. Developed quality projects;
2. PBL team satisfied with the results;
3. Competent and happy students.

### 4.5 PERIOD 4

July - December 2020 Continuation of PBL\_Opto implementation

**Purpose and Specific Objectives:**

The period will be devoted to the continuation of PBL implementation in the Optometry program, this time for the final fourth year students of the program study, the third and the second year. For the fourth year there is a discussion on the advancement in the preparation of the bachelor thesis.

**Expected results:**

1. On going study process with minor impediments;
2. Easy engagement of second year students in the PBL philosophy;
3. PBL team satisfied with the results.

## 4.6 PERIOD 5

*January-June 2021 - First Promotion PBL\_Optomety*

This period coincides with the launch of the first Optometrist graduate cycle. This provides the possibility of international accreditation of the Optometry program and the definitive institutionalization of PBL and other medical education programs.

### **Purpose and specific objectives:**

The purpose of the period is to prepare an Optometrist first promotion, competent, competitive and equipped with practical certain skills to launch an entrepreneurial practice of optometry.

Another specific objective would be the preparation of the premises for the launch of the international accreditation process of the program but also of the initiation of PBL for other medical education programs such as General Medicine, Pharmacy, Dental Medicine, etc.

### **Expected results:**

1. Competent and competitive optometrist promotion;
2. Package of documents required for international accreditation;
3. Full package of PBL educational material for at least one new medical educational program (timetable, curriculum, bibliographic list, completed and approved study cases).

## 4.7 PERIOD 6

*July-December 2021:*

- International Assessment and Accreditation of the PBL\_Optomety Program
- PBL\_next launch

### **Purpose and Specific Objectives:**

The purpose of the period is international accreditation of the program and initiate the implementation of PBL for other medical education programs such as General Medicine, Pharmacy, Dental Medicine, etc.

### **Expected results:**

1. Certificate of international accreditation of Optometry program;
2. Continue PBL\_optometry with small adjustments and improvements;
3. PBL implementation for at least one new medical educational program

## **5 ACTION PLAN**

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### **5.1 INTRODUCTION**

Curricular Reform of the Optometry Study Program and Modernization of the Higher Medical Education Program in the Republic of Moldova in accordance with the Bologna Process through the implementation of the PBL methodology.

### **5.2 ACTIVITIES**

#### **5.2.1 Period 1**

- Developing the curriculum and / or adjusting it for the Optometry study program with the implementation of the "Problem Based and Simulation in Optometry" methodology.
- Develop and / or adjust curricula according to the PBL Curriculum in the partner universities of the project.
- Approval of the PBL-Optometry study program at all courts.

#### **5.2.2 Period 2**

- Familiarize the academic staff and the program managers of USMF "Nicolae Testemitanu" with the PBL methodology by the foreign partners.
- Identification of the facilitators of the academic staff and their involvement in the implementation of the new program.
- Initiating students in PBL.

#### **5.2.3 Period 3**

- Case design for PBL under the guidance of our EU partners.
- Implementation of PBL in Optometry program in USMF "Nicolae Testemitanu".
  1. Testing the new study program:
    - a) the results of the examinations promotion;
    - b) anonymous questioning of students.
  2. Final implementation of the PBL and continuous improvement of the new study program.
  3. The employment rate of graduates trained by the PBL method and comparative analysis with the employability of graduates trained by traditional methods.

#### **5.2.4 Period 4**

- Continuous improvement of the new PBL study program in Optometry.
- The employment rate of graduates trained at Optometry study program by the PBL method and comparative analysis with the employability of graduates trained by traditional methods.

## **5.3 RESOURCES**

### **5.3.1 Period 1**

- Preparing facilitators and developing the training methodology in PBL.
- Staff mobility and familiarization with PBL training methods in EU partner universities.

### **5.3.2 Period 2**

- Arrangement of study rooms with the equipment needed to implement the program.
- Developing and continuously improving the technical-material basis for the Optometry program.
- Republic of Moldova students' mobility in the EU universities.

### **5.3.3 Period 3**

- Identifying and attracting funds for the continued development of the PBL study program in Optometry.

## **6 UNIVERSITY LEVEL STRATEGIC RECOMMENDATIONS**

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### **6.1 INTRODUCTION**

In order to ensure the sustainable development of the PBL study program in Optometry, it is necessary to progressively and gradually improve the capacities and competencies of all the decision and executive staff involved.

### **6.2 RECOMMENDATIONS: STUDY PROGRAMMES LEVELS**

- Creating favorable conditions for aligning the expected changes to the vision, mission and values of the USMF Development Strategy of "Nicolae Testemitanu".
- Adjustment of Optometry study program to the needs and conditions of the Republic of Moldova.

### **6.3 RECOMMENDATIONS: DEPARTMENT AND FACULTY LEVELS**

- Strengthening the capacities and raising the awareness of the changes to be implemented and their continuous prioritization.
- When implementing the program, take into account the wishes and proposals of the students trained in the Optometry program.

### **6.4 RECOMMENDATIONS: STAFF LEVEL**

- Facilitating the training of staff for the PBL program in Optometry.
- Ensure an open, transparent communication that would remain *DECISIVE* in the sustainable development of any implemented change.

### **6.5 RECOMMENDATIONS: STUDENT LEVEL**

- Continuous development of communication and teamwork skills;
- Applying the theoretical knowledge and skills obtained in daily activities;
- Training managerial and entrepreneurial skills;
- Encourage students to participate in the decision-making process.

### **6.6 RECOMMENDATIONS: ADMINISTRATION AND MANAGEMENT LEVELS**

- Support and continuous guidance of top management to ensure project continuity and implementation of the agreed decisions.
- Acceptance, development and implementation of any expected change can only be achieved with the common effort of all subdivisions and staff of the University.

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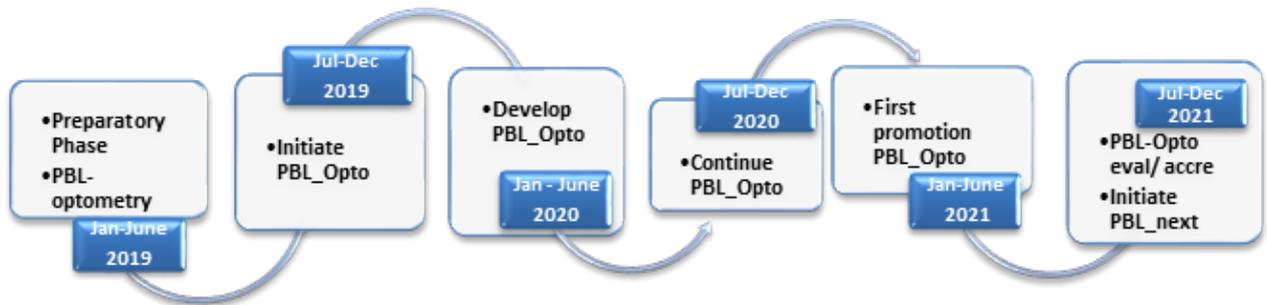
## Appendix 1: Our Visionary BSc in Optometry

### Optometry Study Program

Year of studies	Semester	Subjects				ECTS
I	1	Anatomy, physiology and biochemistry 8 ECTS	Physics and mathematics 6 ECTS	Optica și tehnica optometrică 6 ECTS	Introduction to problem-based learning, communication and medical practice (Course) 10 ECTS	30
	2	Fundamentals of Optometry 4 ECTS	Visual perception 6 ECTS	Metode de examinare 5 ECTS	Public health, epidemiology Research project 15 ECTS	30
II	3	Fundamental bases of contact lenses 6 ECTS	Pharmacology and pathology 5 ECTS	Studii sociale și optometria 4 ECTS	Evidence-based medicine Research project 15 ECTS	30
	4	Binocular view 4 ECTS	Examination methods in optometry 1 6 ECTS	Percepția vizuală 5 ECTS	Biostatistics Research project 15 ECTS	30
III	5	The basics of orthoptics and pediatrics 7 ECTS	Clinical optometry 5 ECTS	Patologia oculară 8 ECTS	Ocular pathologies and clinical optometry 10 ECTS	30
	6	Examination methods in optometry 2 6 ECTS	Visual rehabilitation and visual ergonomics 9 ECTS		Examination methods and visual reconciliation 15 ECTS	30

IV	7	Contact lenses 6 ECTS	Eye Pathology 5 ECTS	Entrepreneurship in optometry 4 ECTS	Manufacture and prescription of contact lenses 15 ECTS	30
	8	Clinical practice 7 ECTS		Research practice (research project) 15 ECTS	Graduation exam 8 ECTS	30

## Appendix 2: Road Map



### Appendix 3: Action plan

	<b>OBC 5.1</b>				RED: 03
	<b>ACTIVITIES IMPLEMENTATION PLAN OF PBL IN OPTOMETRY</b>				Page
<b>2019</b>					
Specific Objectives	Activities	Responsible for implementation	Performance indicators	Note	
1	2	3	4	5	
<p><b>Achieving the student-centered curricular reform aimed at acquiring the necessary skills in the professional activity, in accordance with the national and international standards.</b></p>	<p>2.Periodic evaluation of the study program and its compatibility with the European PBL programs.</p>	<p>Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1</p>	<p>1.1. Initial report of the Curriculum Reform Commission. 1.2. Coherence degree of the study program estimated according to the annual questionnaire of the trainees of <b>at least 75%.</b></p>		
	<p>1. Compatibility of the PBL study program based on ECTS with those of the European partner medical universities of the project to individualize the educational path of each student, ensuring student mobility.</p>	<p>Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1</p>	<p>1.1. Number of students who have benefited from mobility of <b>at least 4.</b></p>		
	<p>2. Optimize the ratio of direct contact hours (lectures and practical tests) and individual work, group work, and project work.</p>	<p>Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1</p>	<p>1.1. Sharing time between student work on the project and direct contact activities of <b>at least 50:50.</b></p>		

<b>II. Continuously improve the quality of admission, training and assessment processes for students.</b>	1.Implement modern methods and techniques of training, based on clinical case and problem.	Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1	1.1 Number of teachers trained with PBL methods and techniques <b>min 8</b> . 1.2 Number of teachers applying modern methods, according to the results of questionnaires of <b>min 8 students</b> .	
	2.Ensure the transparency of the competence assessment process by publishing the results in the Intranet.	Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1 ✓ DTIC	2.1 Number of facilitators who placed on the Intranet the results of evaluating the students' knowledge and practical skills of <b>100%</b> .	
	3.Systematic questioning (at the end of the course) of the students regarding the quality of the PBL didactic process.	Vice-rector on quality Vice-rector on international students ✓ DDMA ✓ Deans FM1	3.1 Number of students undergoing systematic questioning of <b>at least 75%</b> . 3.2 Number of facilitators who practice systematic questioning of the students regarding the quality of the didactic process of <b>at least 3</b>	
<b>III. Promoting the PBL Program in the University and among high school graduates</b>	4. Editing and distributing promotional materials related to the PBL program.	Vice-rector on quality Vice-rector on International Students Department of Public Relations Admissions Commission	4.1 Number of school graduates enrolled in the program promoted by <b>min 12</b> .	

## Appendix 4: 2017 Programme Flier



**ETAPELE PRINCIPALE ALE ÎNVĂȚĂMANTULUI BAZAT PE PROBLEME**

- Obținerea informației inițiale;
- Generarea unei ipoteze clinice inițiale;
- Evidențierea datelor suplimentare importante pentru confirmarea ipotezei inițiale;
- Selectarea testelor de laborator și elaborarea unui plan de investigație pentru precizarea diagnosticului;
- Formularea unui diagnostic prezumptiv sau definitiv;
- Elaborarea unui plan de tratament;
- Sinteza lucrului efectuat și identificarea surselor informaționale necesare pentru o mai bună înțelegere a problemei prezentate.





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**METODE DE INSTRUIRE**

- Prelegeri
- Lecții practice
- Învățare bazată pe probleme (PBL)
- Stagiile practice

În premieră, studenții de la specialitatea Sănătate publică vor beneficia de un modul integrat - *Neuroștiințe*, predat în format PBL (*Problem Based Learning*) grație Proiectului „Introducere în Republica Moldova a metodelor de învățare bazate pe probleme: Sporirea competitivității și angajabilității studenților” (*Introducing Problem Based Learning in Moldova: Toward Enhancing Students’ Competitiveness and Employability*), finanțat de Comisia Europeană în cadrul Programului Erasmus+.



**DURATA MODULULUI**  
1 semestru (17 săptămâni)

**LIMBI DE INSTRUIRE**  
Română și Engleză

**ETAPELE PRINCIPALE ALE ÎNVĂȚĂMANTULUI BAZAT PE PROBLEME**

- Formarea competențelor în echipă;
- Antrenarea și încurajarea gândirii critice, a creativității și a competitivității intelectuale;
- Schimbul de idei și colaborarea activă a studenților atât la nivel de grup, cât și cu facilitatorul.

**OPORTUNITĂȚI**

- Studenții vor beneficia de mobilități academice (semestriale) în universitățile partenere din UE (Instruirea în limba engleză);
- Cooptarea și antrenarea în procesul de instruire a profesorilor din instituțiile partenere.

**CONȚINUTUL PROGRAMULUI**

- Anatomia omului
- Histologie
- Fiziologia omului
- Biochimie
- Fiziologie patologică
- Morfopatologie
- Imagistică
- Neurologie
- Psihiatrie

## Appendix 5: Lessons learned from implementing pilot PBL-based study programme

Implemented activities	Learned lessons
Conceptualization, development, approval and implementation of the Neuroscience course	<ul style="list-style-type: none"> <li>• Working in a multidisciplinary team</li> <li>• Tackle communication difficulties</li> <li>• Resistance to change</li> <li>• Insufficient skills</li> <li>• Managing prioritization of selected topics</li> </ul>
Conceptualization, development, approval and implementation of the Neuroscience course's timetable	<ul style="list-style-type: none"> <li>• Logistics management of the course</li> <li>• Difficulties in the equitable distribution of hours</li> <li>• Logical synchronization of the presented material</li> <li>• Ensuring the continuity of the course</li> <li>• Placing the course timetable in the university-specific timetable</li> </ul>
Development of clinical cases	<ul style="list-style-type: none"> <li>• Difficulties in prioritizing selected topics for clinical cases</li> <li>• Insufficient competence in case formulation</li> </ul>
Organizing training programs for trainers involved in the course	<ul style="list-style-type: none"> <li>• Working in a multidisciplinary team</li> <li>• Addressing communication difficulties</li> <li>• Resistance to change</li> <li>• Insufficient skills</li> </ul>
Course progression / development	<ul style="list-style-type: none"> <li>• Resistance to change by students</li> <li>• Low flexibility in accepting the new methodology</li> <li>• Low self-organization and self-expression skills</li> <li>• Low team work capabilities</li> <li>• Insufficient skills in relation to research methodology</li> <li>• Confusion on the concept of interdisciplinarity</li> </ul>

