

## CRITERIA

**for a 10-grade scale estimation of the knowledge on Microbiology, Virology and Immunology shown by international students during their study at the Department of Microbiology, Virology and Immunology named after S.I. Gelberg of the Institution of Education «Grodno State Medical University»**

### **1.0. CRITERIA FOR EVALUATION OF THE KNOWLEDGE SHOWN BY THE STUDENTS DURING ORAL (OR WRITTEN) ANSWER**

**Mark 10 (ten)** is credited for systematic, deep and complete knowledge of all sections of the Curriculum in Microbiology, Virology and Immunology, using information from other training courses and disciplines. Accurate use of scientific terminology, competent and logically correct formulation of answers to questions, the ability to make appropriate conclusions and summaries. The ability to consciously and quickly transform the acquired knowledge when describing the theoretical and clinical-diagnostic aspects of Microbiology, Virology and Immunology. Complete and deep mastering the information based on main and additional literature recommended by the Curriculum in Microbiology, Virology and Immunology. Fluency in operation by clinical and diagnostic values of laboratory parameters. Creative self-dependent work in practical and laboratory classes, active creative participation in group discussions, and a high level of intelligence shown during the solving study tasks.

**Mark 9 (nine)** is credited for systematic, deep and complete knowledge of all sections of the Curriculum in Microbiology, Virology and Immunology. Accurate use of scientific terminology, competent and logically correct formulation of answers to questions, the ability to make appropriate conclusions and summaries. Complete mastering the information based on main and additional literature recommended by the Curriculum in Microbiology, Virology and Immunology. Systematic, active self-dependent work in practical and laboratory classes, creative participation in group discussions, and a high level of intelligence shown during the solving study tasks.

**Mark 8(eight)** is credited for systematic and complete knowledge of all sections of the Curriculum in Microbiology, Virology and Immunology. Use of scientific terminology, competent and logically correct formulation of answers to questions. Free use of drawings to illustrate the answer. Mastering the information based on main and additional literature recommended by the Curriculum in Microbiology, Virology and Immunology. Active self-dependent work in practical and laboratory classes, systematic participation in group discussions, and a high level of intelligence shown during the solving study tasks.

**Mark 7 (seven)** is credited for systematic and complete knowledge of all sections of the Curriculum in Microbiology, Virology and Immunology. Ability to use the scientific terminology, competent, logically correct formulation of answers to questions. Sufficiently complete mastering the material of the main and additional literature recommended by the Curriculum in Microbiology, Virology and Immunology. Independent work in practical and laboratory classes, participation in group discussions, and a high level of intelligence shown during the solving study tasks.

**Mark 6 (six)** is credited for sufficiently complete and systematic knowledge in the scope of the Curriculum in Microbiology, Virology and Immunology. Ability to use the necessary scientific terminology, logically correct formulation of answers to questions, use of drawings to illustrate the answer. Mastering the material of the ground literature recommended by the Curriculum of Higher Education Institutions in Microbiology, Virology and Immunology. Independent work in practical, laboratory classes, periodic participation in group discussions, a good level of culture of task execution.

**Mark 5 (five)** is credited for sufficient knowledge within the scope of the Curriculum in Microbiology, Virology and Immunology. The ability to use of scientific terminology, fairly competent and logically correct formulation of answers to questions involving application of separate schemes. Satisfactory mastering the material of the ground literature recommended by the Curriculum in Microbiology, Virology and Immunology. Independent work in pract

fragmentary participation in group discussions, and a sufficient level of intelligence shown during the solving study tasks.

**Mark 4 (four)** is credited for sufficient knowledge within the scope of Educational Standard of Higher Education in the specialty 79 01 04 - Medical Affair. Use of scientific terminology and drawings without significant mistakes, rather logical formulation of answers to questions. Satisfactory mastering the ground material recommended by the Curriculum in Microbiology, Virology and Immunology. Ability to master practical skills under the guidance of a teacher during practical laboratory classes, and the acceptable level of intelligence shown during the solving study tasks.

**Mark 3 (three) – not credited** for insufficiently complete volume of knowledge within scope of Educational Standard of Higher Education in the specialty 79 01 04 - Medical Affair. Poor knowledge of scientific terminology, formulation of answers to questions with significant logical mistakes. Mastering only part of the material of the main literature recommended by the Curriculum in Microbiology, Virology and Immunology. Passivity shown in practical laboratory classes, and low level of intelligence shown during the solving study tasks.

**Mark 2 (two) – not credited** for fragmentary volume of knowledge within scope of Educational Standard of Higher Education in the specialty 79 01 04 - Medical Affair. Mastering only separate parts of the material of literature sources recommended by the Curriculum in Microbiology, Virology, and Immunology. Inability to use the scientific terminology in Microbiology, Virology and Immunology, making serious logical mistakes when answering questions. Passivity shown in practical laboratory classes and low level of intelligence shown during the solving study tasks.

**Mark 1 (one) – not credited** for the complete lack of knowledge on the subject within scope of Educational Standard of Higher Education in the specialty 79 01 04 - Medical Affair, the refusal of a student to answer, absence of a student during the intermediate or final control of the knowledge without a valid reason.

In the beginning of every lesson every teacher has to answer the questions asked by students and explain more complicated and difficult for understanding parts of the study material. After fulfilling the discussion teacher starts controlling part of the lesson: computer-based assessment work and oral discussion (or written work) to reveal the knowledge of the study material by every student.

Before the beginning of oral (or written) survey, the computer-based assessment work is conducted to reveal the ground knowledge of theoretical material by students. If a student receives a positive mark: marks varying from "8" to "4", this student is allowed to participate in the next stage of the lesson: an oral (or written) survey. If the received mark is unsatisfactory: varies from "3" to "1", oral (or written) survey is not conducted. When a student receives the maximum mark, "8", during the computer-based assessment work, this student receives one grade additionally to the mark obtained for the oral (written) answer during the survey.

During the oral (or written) survey on the theme of the lesson teacher asks students to give oral (or written) answer to the question on the theoretical material of the current lesson. The teacher asks questions grounded on the main material of the Curriculum on the current theme (described in the training appliances and in Moodle). To get higher marks students are stimulated to demonstrate knowledge of additional material including:

- the information given by a lecturer during the lecture,
- material of the appliances containing whole lecture material (on the corresponding section of Microbiology) and online textbooks,
- Wikipedia (Internet resources).

The answer of students is evaluated by a mark according to the criteria of the mark estimation shown above. In order to activate the work of students at the class, in the case when the student who was asked orally failed to give answer to the question, lecturer can ask other student from the group to answer the same question. If other student will give right answer, the mark obtained by this student

during survey (oral or written) will be increased by one grade. If the given answer is not correct the student does not get any additional grades.

### 1.1. CRITERIA FOR EVALUATION OF THE KNOWLEDGE SHOWN BY STUDENTS DURING COMPUTER - BASED ASSESSMENT

Computer-based assessment work is created with use of the basic information of the lecture material on the current theme and presented in a brief form in the training appliances (or also in Summaries of the lectures on current lessons in **MOODLE**). Every student has to study this information and to carry out the computer-based assessments on every lesson which is also available in **MOODLE** program at the University site.

Computer-based work is a part of the lesson revealing the ground knowledge of theoretical material. This work includes the next categories of questions and tasks which a student has to perform:

1. to choose one right answer from the proposed variants;
2. to choose several right answers from the proposed variants;
3. to choose the variants according to their conformity;
4. to choose the variants corresponding to their accordance to the group;
5. to choose the variants corresponding to their right sequence;
6. to type the answers using the key-board of the computer.

Student has to give answers to 15 questions on the theme of the current lesson in 15 minutes. The complexity of the questions differs, so the input of every answer into the final mark is different. In addition, a partially correct answer is taken into account. The computer program calculates the proportion of correct and incorrect answers, taking into account the total "weight" of the questions offered to the student and the "soft" assessment of some questions, and gives the mark got by student after fulfilling the computer work. The mark varies from 1 to 8 (Fig. 1).

Current Lesson	
Index, %	Mark
100	8
95	7
75	6
50	5
25	4
15	3
1	2
0	1

Fig. 1. Criteria for evaluation of a computer-based assessment during current lesson.

### 1.2. CRITERIA FOR EVALUATING PRACTICAL SKILLS IN MICROBIOLOGY, VIROLOGY AND IMMUNOLOGY

The practical skills including ability to manipulate with the light microscope using the immersion system and to carry out standard bacteriological techniques are mastered in the laboratory classroom and later are controlled at the intermediate control lessons (mini-exams).

When studying the subject of Microbiology, Virology and Immunology, every student has to master the following practical skills:

- 1) to follow safety rules and techniques when performing laboratory work;
- 2) to master the main stages of the method of growing of bacterial culture (Table 1):

- 3) to master microscopy techniques and approaches to identification of microorganisms in smears using an immersion system;
- 4) to know the algorithm of setting up of serological tests (reactions) and approaches to evaluation of their results;
- 5) to be able to explain the main indexes of the immunogram.

The groups of practical skills which students have to master at the practical part of Concluding lesson (mini-exam) on the corresponding Sections of Microbiology (Section N1 – General Microbiology, Section N2 – Immunology and Section N3 – Medical Bacteriology)

Table 1.

Groups of practical skills mastered by students in the process of studying Microbiology, Virology and Immunology

	The name of the skill	The number of the Concluding lesson			The way of estimation
		N1	N2	N3	
1	The algorithms of staining techniques	+		+	Computer-based work
2	Making a smear, seeding of the material containing bacteria and other standard bacteriological techniques	+		+	A lecturer
3	Immersion microscopy technique	+		+	A lecturer
4	The algorithms of setting up serological reactions		+	+	Computer-based work
5	The estimation of the results of serological reactions(reading of the results of the tests)		+	+	Computer-based work
6	Identification of microorganisms in the smears	+		+	Computer-based work
7	Evaluation of the immunogram		+	+	Computer-based work
8	Visual evaluation of the growth characteristics of microorganisms and of their features	+		+	Computer-based work

Table 2.

The criteria of evaluation of the practical skills including making smear, seeding of the material containing bacteria and other standard bacteriological techniques performed by a student

The performed work	The evaluation
Satisfactory (good) work	= (no change to the basic mark)
Non satisfactory work done with significant mistake	- 1 grade

Table 3.

The criteria of evaluation of the microscopy techniques using an immersion system

Time taken for the performance of the technique	The evaluation
45 seconds or less	= (no change to the basic mark)
46 or more	- 1 grade

Besides that, all students have to give answer to one question of the computer-based assessment of practical skills knowledge. The time limit is 1 minute. Correct answer (highlighted in green) or

partially correct answer (highlighted in yellow) do not change the student's grade at the lesson. If the answer is incorrect (highlighted in red), the mark for the lesson is reduced by one grade.

Thus, the evaluation of mastering practical skills and abilities performed by every student at every practical lesson is conducted and estimated as: "credited" – " = " or "not credited" – "– ". The mark obtained by student for oral answer can be decreased for non-satisfactory results of mastering practical skills and or wrong answer the question of the Practical skills computer-based assessment.

### 1.3. CRITERIA FOR EVALUATION OF THE KNOWLEDGE SHOWN BY STUDENTS DURING THE INTERMEDIATE CONTROL (CONCLUDING LESSON OR MINI-EXAM)

During intermediate control of knowledge (mini-exam), the basic mark is calculated as an average value according to the formula: basic mark of intermediate control =  $0.4 \times A + 0.6 \times O(W)$ , where: **A** is Average current mark (average value of the marks obtained during the current classes when the corresponding section of the Subject “Microbiology, Virology, Immunology” was studied) and **O(W)** is the mark obtained for Oral (or Written) answer of student given to one of the question within the Curriculum.

At the concluding lesson (mini-exam) every student has to answer one of the questions orally (or in written form) and to demonstrate knowledge of the theoretical material on the subject. The answer of every student is evaluated according to the criteria shown above in the Section 1.0.

The computer-based assessment proposed for the intermediate control will include all questions of the Curriculum on the corresponding Section. The number of questions and the time limit given for answer is the same, but the criteria of evaluation are different (Fig. 2).

Concluding Lesson (Mini-Exam)	
Index, %	Mark
93	8
87	7
81	6
75	5
65	4
33	3
1	2
0	1

Fig. 2. Criteria for evaluation of a computer-based assessment during an intermediate control of knowledge (the concluding lesson).

Before the beginning of oral (or written) survey, the computer-based assessment work is conducted. If a student receives positive mark (marks varying from "8" to "4"), such a student is allowed to the next stage of the mini-exam: an oral (or written) survey. If the received mark is unsatisfactory: varies from "3" to "1", oral (or written) survey is not conducted. When a student receives the maximum mark, "8", during the computer-based assessment work, this student gets one grade additionally to the mark obtained for the oral (written) answer during the survey.

Mastering all practical skills, including ability to manipulate with the light microscope using the immersion system and to carry out standard bacteriological techniques is controlled at the intermediate control lessons (mini-exams). The computer-based assessment of practical skills knowledge is also performed. All students have to give answer to one question during 1 minute. Correct answer (highlighted in green) and partially correct answer (highlighted in yellow) do not change the student's mark at the mini-exam. If the answer is incorrect (highlighted in red), the mark obtained for the oral (or written) answer is reduced by one grade.



At the concluding lesson (mini-exam) every student has to demonstrate mastering of the light microscopy techniques and to be able to perform on of the skills of the standard bacteriological technique (Tables 1 – 3).

Evaluation of the results of mastering the practical skill by students at the mini-exams is carried out taking into account the quality of the performed work, however, this stage of the mini-exam is not evaluated by a separate mark. The result of performed work can change (or not changed) the mark received by the student during the oral (or written) survey (see section 1.2.).

***The mark received by student for oral (or written) answer can be decreased for non-satisfactory results of mastering practical skills and/or wrong answer the question of the Practical skills computer-based assessment.***

#### 1.4. CRITERIA FOR EVALUATION OF THE KNOWLEDGE SHOWN BY STUDENTS DURING THE FINAL CONTROL OF KNOWLEDGE (EXAM)

Before the start of oral (or written) answer at the final control of knowledge shown by students (i.e., at the Exam), the students will have to pass a computer-based assessment, which includes theoretical material from four sections of the subject (General Microbiology, Immunology, Medical Bacteriology and Virology).

The computer-based assessment proposed for the exam will include all questions of the Curriculum on the subject. The assessment of every section includes the same number of questions proposed to the student and the same limit of time for answering, if compare with separate mini-exams on the sections, but the criteria used for estimation of the results are different (Fig. 3).

Final control of knowledge (Exam)	
Index, %	Mark
87	8
81	7
75	6
65	5
33	4
17	3
1	2
0	1

Fig. 3. Criteria for evaluation of a computer-based assessment during the final control of knowledge (exam).

The students who have successively passed a computer-based assessment will receive an examination paper (ticket) and will have to answer the exam questions orally (or in writing form). The survey is conducted only for those sections of the subject for which the student received a positive assessment of computer-based assessment. The student's answer to the questions on the exam ticket is evaluated according to the criteria described in section 1.0. The practical skill assessment for the subject is not performed during the Exam. The final Exam score is calculated taking into account the average value of the marks obtained for the answers given to each question of the ticket during the Exam, as a weighted average using the formula:

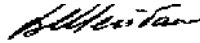
Exam mark =  $0.4 \times \mathbf{A} + 0.6 \times \mathbf{O (W)} + \mathbf{B}$ , where:

**A** – academic performance during the study (the average score of four marks, which includes average of three mini-exam marks and the average score of classes in Virology).

**O (W)** – average score for the answer to the questions of the Exam ticket (see above).

**B** – number of additional **bonuses** (points) received by the student for participation in Olympiads and for student research work at the Department of Microbiology.

Head of the Department of Microbiology,  
Virology and Immunology named  
after S. I. Gelberg, Professor



V. M. Sheybak

Approved at the meeting of the Department of Microbiology, Virology and Immunology named  
after S. I. Gelberg (Protocol No. 1, the 28th of August, 2020).