FACULTY OF MEDICINE

STUDY PROGRAM 0912.1 MEDICINE

DISCIPLINE OF MICROBIOLOGY AND IMMUNOLOGY

DEPARTAMENT OF PREVENTIVE MEDICINE

APPROVED
at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum Faculty of Medicine
Minutes No. 1 of 16.09.21
Chairman PhD, associate professor
Suman Serghei

APPROVED
at the Council meeting of the Faculty of Medicine
Minutes No. 1 of 21.09.21
Dean of Faculty of Medicine
PhD, associate professor
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APPROVED
at the meeting of the Discipline of microbiology and immunology
Minutes No. 2 of 14.09.2021
Head of Discipline, PhD, Professor, academician
Rudic Valeriu

SYLLABUS

Subject **SANITARY MICROBIOLOGY**

Integrated studies

Course type: **Disciplină opţională**

The syllabus elaborated by authors:

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Bălan Greta, PhD, M.D., associated professor.

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I. PRELIMINARIES

- **Discipline overview: place and role of the discipline in the formation of specific competencies of the training program / specialty**

Sanitary microbiology is that part of microbiology that deals with the contamination of environmental objects and their role in the transmission of infectious diseases.

The course of Sanitary Microbiology aims to deepen the knowledge in the study of the possibilities and mechanisms of transmission of various infectious diseases. This course completed the knowledge about the role of environmental factors in the production of communicable diseases, establishing the need to meet the essential conditions in the existence of pathogens, their presence in environmental elements and routes of transmission to the receptive host. The teaching of the main departments of the discipline is recommended to be done in complex with other related disciplines.

The purpose of the module is to deepen the theoretical knowledge, skills and competencies regarding the role of environmental objects in the transmission of infectious diseases.

The course Sanitary Microbiology aims to help future doctors to know the relationship between microorganism → environmental objects → receptive organism → sanitary-microbiological techniques → result in accordance with current requirements and regulations.

- **The mission of the syllabus (purpose) in vocational training**

The role of Sanitary microbiology is to train students in theoretical questions and practical skills, with which they can use in medical practice: medical research, the role of pathogenic and potentially pathogenic microorganisms in triggering the infectious process, the role of environmental objects in transmission infectious diseases, techniques for examining environmental objects and interpreting the results.

- **Language of instruction:** Romanian.

- **Beneficiaries:** 2nd year students, Faculty of Medicine.

I. DISCIPLINE ADMINISTRATION

Discipline code		**S.04.A.037.2**	
The title of the discipline		**Sanitary microbiology**	
Discipline officers		PhD, M.D., associated professor **Greta Balan**	
Year	**II**	Semester	**IV**
Total number of hours: **30**			
Courses	**10**	Practical (lab) work	**10**
Seminars	**-**	Individual work	**10**
Evaluation form	**E**	Credits number	**1**

II. DISCIPLINE TRAINING OBJECTIVES

At the end of the study the student will be able to:

To know:

- Theoretical bases of sanitary microbiology.
- Knowledge of the role of environmental factors in the transmission of infectious diseases.
- Knowledge of the techniques and methodology of the sanitary-microbiological examination of environmental objects.
- Abilities to interpret the technical-normative documentation, the results of the sanitary-microbiological examination in order to determine the degree of pollution of environmental objects.

To apply:

- Dexterities of collecting and transporting the samples to be analyzed for sanitary-microbiological investigations;
- Skills in the use of technical-normative documentation in sanitary microbiology;
- Skills in interpreting the results of sanitary-microbiological investigations;
- Information technology skills (use of computer data, evaluation of the advantages and disadvantages of information systems, basic knowledge of the need for data protection).

To integrate:

- Microbiological knowledge obtained in the context of the future profession;
- Understanding the interconnection between Sanitary microbiology and other related disciplines;
- Implementing the knowledge gained in the research activity;
- Critical and reliable use of scientific information obtained using new information and communication technologies.

III. CONDITIONS AND PREREQUISITES

At the level of medical university studies, the integration of the sanitary microbiology module aims to ensure a close representation of the reality of what are the sanitary microorganisms-indicators, as well as the role of environmental objects in the transmission of infectious diseases.

For the good acquisition of Sanitary Microbiology, the conceptual, methodological and factual support is necessary through the important contribution of biochemistry, genetics, cellular and molecular biology, hygiene, epidemiology, infectious diseases.

IV. TOPICS AND ORIENTATIVE DISTRIBUTION OF HOURS

Courses (lectures), practical work / laboratory work / seminars and individual work

Nr. d/o	TEMA	Numărul de ore		
		Prelegeri	LP/Sm	Lucru individual
1.	Sanitary microbiology: definition and objectives. Microbiological indicators of environmental pollution.	2	2	2
2.	Ways of water pollution. Waterborne pathogens. Microbiological indicators of water pollution. Microbiological methods for water analysis.	2	2	2
3.	The role of air in spreading of infectious diseases. Microbiological methods for air analysis.	2	2	2
4.	Microbiology of food. The role and significance of microorganisms in food. Principles of microbiological examination of food products.	2	2	2
5.	Contemporary methods used in sanitary microbiology. Qualitative and quantitative methods. The principles of contemporary methods used in monitoring environmental objects.	2	2	2
Total 240		**10**	**10**	**10**

V. REFERENCE OBJECTIVES AND UNITS OF CONTENT

Objectives	Units of content
Topic 1. Sanitary microbiology: definition and objectives. Microbiological indicators of environmental pollution.	
• to define sanitary microbiology. • to know the tasks and purpose of sanitary microbiology. • to know the study elements of sanitary microbiology. • list the microbiological indicators of pollution.	Sanitary microbiology as a definition. Tasks and purpose of sanitary microbiology. Elements of Sanitary microbiology study. Defining microbiological pollution indicators. Characteristics of microbiological indicators.
Topic 2. Ways of water pollution. Waterborne pathogens. Microbiological indicators of water pollution. Microbiological methods for water analysis.	
• to know the role of water as an environmental factor and the main microorganisms transmitted through water. • to know the sanitary norms and conditions of drinking water quality. • to know the considerations regarding the sanitary-microbiological examination of the water.	Water as an environmental factor. Ways of biological water pollution. Waterborne pathogenic and potentially pathogenic microorganisms. Microbiological indicators of water pollution. Microbiological examination of water.
Topic 3. The role of air in spreading of infectious diseases. Microbiological methods for air analysis.	
• to know the role of air in the spread of infectious diseases.	The origin of microorganisms in the air. The role of air in the spread of infectious diseases.

Objectives	Units of content
• to know indications for the application of microbiological air control. • know the rules on the microbial content of the air in different rooms, • to know considerations regarding the determination of contamination of objects and skin surfaces.	The mechanism of contracting the pathogenic flora in the air. Guidelines for the application of air microbiological control and regulations. Microbiological indicators of air pollution. Contamination of objects and skin surface. Microbiological analysis of air. Methods of collecting air samples. Determination of microbiological indicators. Methods of determining contamination of objects and skin surface.
Topic 4. Microbiology of food. The role and significance of microorganisms in food. Principles of microbiological examination of food products.	
• to know the role and significance of microorganisms in food. • to know the main microorganisms isolated from food. • to know the main microbiological health indicators for food appreciation. • to know general considerations regarding the microbiological sanitary examination of foodstuffs.	The role and significance of microorganisms in food. Microorganisms found in food. Ecological food-microorganism relationships. Microbiological health indicators for food appreciation. Principles of microbiological sanitary examination of food products.
Tema 5. Contemporary methods used in sanitary microbiology. Qualitative and quantitative methods. The principles of contemporary methods used in monitoring environmental objects.	
• to know the alternative methods used in the microbiological examination of water. • to know the principle of methods of microbiological examination of water. • to know the contemporary microbiological methods used in food quality control. • to know the microbiological methods of monitoring environmental objects.	Microbiological parameters of interest for water of different origin. The principle of the method with defined enzymatic substrate - determination of total coliforms, *E.coli*, enterococci. Qualitative and quantitative method. Principle of the method Tempo, miniVidas, Mass Spectrometry. The principles of contemporary methods used in monitoring environmental objects.

VI. PROFESSIONAL SKILLS (SPECIFIC (SS) AND TRANSVERSAL (TS)) AND PURPOSE OF STUDY

✓ Professional skills (specific) (SS)

- SS1. Responsible execution of professional tasks with the application of the values and norms of professional ethics, as well as the provisions of the legislation in force
- SS2. Adequate knowledge of the sciences about the structure of the body, the physiological functions and behavior of the human body in various physiological and pathological conditions, as well as the relationships between health, physical and social environment
- SS3. Promoting a healthy lifestyle, applying prevention and self-care measures
- SS4. Interdisciplinary integration of the doctor's activity in a team with efficient use of all resources
- SS5. Carrying out scientific research in the field of health and other branches of science

✓ **Transversal skills (TS)**

- TS1. Autonomy and responsibility in the activity.

Study purposes

Upon completion of the course study the student will be able to:

- To have basic knowledge with the application of principles and methods for solving well-defined situation problems, typical of the field of Sanitary microbiology;
- To use the knowledge in the management of sanitary microbiology, to respect quality conditions, to know techniques of examination and study of environmental factors.
- Know the techniques of sampling, transport, preservation and labeling of samples to be analyzed.
- To use the knowledge for the truthful interpretation of the results of the sanitary-microbiological examination.
- Apply knowledge in determining the role of environmental objects in the transmission and onset of infectious diseases.

VII. THE INDIVIDUAL WORK OF THE STUDENT

Nr.	Outcomes	Implementation strategies	Evaluation criterias	Deadline
1.	Working with information sources:	Reading courses or textbook material on the topic. Study the questions on the topic, which require reflection on the topic. To be acquainted with the list of additional information sources on the respective topic. Select the source of additional information on the topic. Formulation of generalizations and conclusions regarding the importance of the topic / subject.	Logical thinking; interpretive skills; flexibility; the quality of the systematization of the informational material obtained through its own activity; the concordance of the information with the proposed topic	During the module
2.	Working with materials online	Studying online materials from information sources, expressing one's opinions through forum and chat	Number and duration of entries on online sources, analysis of materials	During the module
3.	Report	Analysis of relevant sources on the topic of the paper. Analysis, systematization and synthesis of information on the proposed topic. Preparation of the report in accordance with the requirements in force and its presentation to the department.	The quality of the systematization and analysis of the informational material obtained through own activity. Conformity of the information with the proposed topic	During the module

VIII. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-EVALUATION

- ***Teaching and learning methods used***

Exposure, interactive lecture, heuristic conversation, problem solving, brainstorming, group work, individual study, work with textbook and scientific text, debate, problem solving, interactive listening.

- ***Assessment methods*** *(including how to calculate the final grade)*

Current: frontal and / or individual control via
(a) case study analysis
Final: exam

The final grade will consist of the average score of 1 control tests and the grade from the individual work assessment (share 0.5) and final test (computer testing) (share 0.5).

The final note will consist of the result of the synthesis of the selected/presented material, verbal communication with the attested/not certified.

How to round the grades at the assessment stages

Grade of intermediate grades (annual average, grades from exam stages)	National scoring system	Equivalent ECTS
1,00-3,00	**2**	**F**
3,01-4,99	**4**	**FX**
5,00	**5**	**E**
5,01-5,50	**5,5**	
5,51-6,0	**6**	
6,01-6,50	**6,5**	**D**
6,51-7,00	**7**	
7,01-7,50	**7,5**	**C**
7,51-8,00	**8**	
8,01-8,50	**8,5**	**B**
8,51-8,00	**9**	
9,01-9,50	**9,5**	**A**
9,51-10,0	**10**	

Annual average grade and grades of all stages of the final examination (computer-assisted, test, oral answer) - all will be expressed in numbers according to the grading scale (according to the table), and the final grade obtained will be expressed in two decimal places, which will be entered in the notebook.

Failure to appear at the colloquium without good reason is recorded as "absent" and is equivalent to a grade of 0 (zero). The student is entitled to 2 repeated supports of the unpromoted colloquium.

IX. RECOMMENDED BIBLIOGRAPHY:

A. Mandatory:

1. Guidelines, recommendations, and methodical indications.
2. Materials of theoretical courses.

B. Suplimentary:

1. Bergey's Manual of determinative bacteriology (ninth edition), 20011.