SYLLABUS
Faculty of Stomatology

The purpose of the subject Microbiology, Virology, Immunology:

To acquire basic knowledge in fundamental microbiology. To apply this knowledge in the basic fields of medicine studies: medical research, molecular diagnostics and epidemiology of infections. To train students to apply the main laboratory techniques necessary for a general practitioner. Study of etiology, pathogenesis and laboratory diagnostics of infectious and specific viral diseases.

Objectives of the subject Microbiology, Virology, Immunology:

At the level of knowledge and understanding:

1. To know the classification of microorganisms and its nomenclature principles.
2. To know the morphology, structure and physiology of bacteria and viruses.
3. To know the main families of antibiotics (classification, mechanism of action, range of activity).
4. To know the mechanisms of resistance to antibiotics.
5. To know the antibiotic activity parameters (antibioticogram, MIC, MBC) in vitro.
6. To know the habitat of bacteria.
7. To know pathogenicity of bacteria and to understand the role of pathogenicity factors in pathogenesis of infectious diseases.
8. To understand the importance of bacteria and viruses as etiologic agents of various infectious clinical entities.
10. To know microbiological diagnosis methods.
11. To know the main diagnostic bacteriological analyses (uroculture, hemoculture, coproculture, examination of spinal fluid, pus, sputum).
12. To know pathophysiology of the most common viral infections, notions of viral oncogenesis.
13. To know diagnostic methods of viral infections.
14. To know basic notions of fundamental and medical immunology.

At the level of practical use:

1. To differentiate between cellular and acellular life forms.
2. To differentiate eukaryotic and prokaryotic cell.
3. Skills of observing rules/requirements of an anti-epidemic regime and protective measures in microbiological labs.
4. Dexterity to harvest pathological products for bacteriological, virological and immunological investigations (pus, sputum, blood, spinal fluid, urine, secretion from nasopharynx, feces, etc.).
5. Skills of filling in analysis forms/bulletins for bacteriological, virological and immunological examinations.
6. Skills of interpretation the results of bacteriological, virological and immunological examinations in clinical context.
7. Skills of interpretation and apply results of antibioticograms.
8. Skills of preparing and staining smear from pathological products and from pure culture of microorganisms.
9. To differentiate between gram negative and gram positive, acid-fast and nonacid bacteria.
10. Skills to use a light microscope with immersion.

At the level of integration:

1. To appreciate the importance of Microbiology, Virology, Immunology in the context of infectious pathology.
2. To understand the interconnection between Microbiology and other related subjects: Infectious diseases, Epidemiology.
3. To implement and integrate microbiological knowledge of microbiology in clinical subjects.
4. To assimilate new knowledge in the field of infectious pathology.
5. To implement the acquired knowledge in research activities.
6. To use new scientific information and technologies.
7. To use multimedia technology for receiving, evaluating, storing, producing, presenting and exchanging information, on the internet.

**Preliminary terms and requirements:**

At the level of university medical studies, the integration of bacteriology, virology, study of infection and immunity into one subject has the purpose to assure a representation, as close as possible to reality, of what microbes are, as well as the relationship of microorganism with their human host and the abiotic environment they live in.

The conceptual, methodological and factual support through the contribution of chemistry, biochemistry, physics, biophysics, physiology, genetics, cellular and molecular biology is necessary for the good comprehension of Microbiology and Immunology

**The basic content of the course:**

**A Lectures:**

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Subject</th>
<th>hours</th>
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<tbody>
<tr>
<td>1.</td>
<td>Bacterial morphology and structure. Chemical composition, biological functions and methods of cell structure identification.</td>
<td>2</td>
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<tr>
<td>3.</td>
<td>Microbial antagonism. Antibiotics. Antibiotic susceptibility test.</td>
<td>2</td>
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<td>4.</td>
<td>Infectious process. Non-specific host defence</td>
<td>2</td>
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<td>5.</td>
<td>Immunity. Immune system. Antigens Antibodies</td>
<td>2</td>
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<tr>
<td>6.</td>
<td>Immunological diagnostic method. Direct serological reactions. Practical application.</td>
<td>2</td>
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<td>7.</td>
<td>Immunoprophylaxis and immunotherapy in infectious diseases.</td>
<td>2</td>
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<tr>
<td>8.</td>
<td>General characteristics of pyogenic cocci. Microbiology and laboratory diagnosis of staphylococcal and streptococcal infections.</td>
<td>2</td>
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<tr>
<td>9.</td>
<td>Microbiology and laboratory diagnosis of diphtheria, tuberculosis and whooping cough.</td>
<td>2</td>
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<tr>
<td>13.</td>
<td>Sanitary microbiology. Microbiological indicators. Microbiological analysis of water and air.</td>
<td>2</td>
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<tr>
<td>14.</td>
<td>Ecology of the oral cavity. Factors that control microbiological condition of the oral cavity.</td>
<td>2</td>
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<tr>
<td>15.</td>
<td>Specific and nonspecific pathological processes(bacterial, fungal, viral) in the oral cavity.</td>
<td>2</td>
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**A. Practical classes:**
<table>
<thead>
<tr>
<th>Nr.</th>
<th>Subjects</th>
<th>Hours</th>
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<tbody>
<tr>
<td>1.</td>
<td>Microbiological laboratory. Bacterial morphology. Microscopy. Simple staining techniques.</td>
<td>2</td>
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<tr>
<td>4.</td>
<td>Bacterial morphology and ultrastructure of spirochetes, rickettsia, chlamydia, mycoplasma, actinomycetes. Methods to study.</td>
<td>2</td>
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<tr>
<td>5.</td>
<td><strong>TEST I “Morphology and structure of microbes”</strong>.</td>
<td>2</td>
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<tr>
<td>10.</td>
<td><strong>TEST II “Physiology of bacteria. Antibiotics”</strong>.</td>
<td>2</td>
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<tr>
<td>15.</td>
<td><strong>TEST III „Infection and immunity”.</strong></td>
<td>2</td>
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<tr>
<td>16.</td>
<td>General characteristics of pyogenic cocci. Microbiology and laboratory diagnosis of staphylococcal and streptococcal infections, meningococcal and gonococcal infections.</td>
<td>2</td>
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<td>17.</td>
<td>Microbiology and laboratory diagnosis of zooanthroposisis infections (brucellosis, tularemia, anthrax, plague).</td>
<td>2</td>
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<td>18.</td>
<td>Microbiology and laboratory diagnosis of anaerobic bacteria.</td>
<td>2</td>
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<td>19.</td>
<td>Microbiology and laboratory diagnosis of tuberculosis, diphtheria and whooping cough.</td>
<td>2</td>
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<tr>
<td>20.</td>
<td>Microbiology and laboratory diagnosis of spirochetes.</td>
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<td>22.</td>
<td>Microbiology and laboratory diagnosis of escherichiosis and dysentery.</td>
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<td>23.</td>
<td>Microbiology and laboratory diagnosis of typhoid, paratyphoid fever and salmonellosis (non typhoid Salmonella).</td>
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<td>24.</td>
<td>Family Vibrionaceae and Campylobacteriaceae. Microbiology and laboratory diagnosis of cholera and campylobacteriosis.</td>
<td>2</td>
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<td>25.</td>
<td><strong>TEST V “Intestinal infections”</strong>.</td>
<td>2</td>
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<tr>
<td>26.</td>
<td>Microbiology and laboratory diagnosis of rickettsiosis.</td>
<td>2</td>
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<tr>
<td>28.</td>
<td>Family Picornaviridae. Microbiology and laboratory diagnosis of</td>
<td>2</td>
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</table>
### 29. Family Retroviridae. Laboratory diagnosis of HIV. AIDS. Viral oncogenesis. Family Herpesviridae, Family Poxviridae, Family Adenoviridae.

### 30. Sanitary microbiology. Microbiological indicators. Microbiological analysis of water and air.

### 31. TEST VI "Viruses. Viral infections."

### 32. The normal microflora of the oral cavity. Quantitative determination of Lactobacteria of the oral cavity.

### 33. Microbiological investigation in the preventing of periodontal disease.

### 34. Laboratory diagnosis of bacterial and viral disease of OMF region.

## Recommended literature:

### A. Mandatory:

1. Anda Băicuş. Bacteriologie și imunologie [Bacteriology and Immunology]. The University Publishing house „Carol Davila”, Bucharest, 2011
5. The Microbiology coloring book, I. Edward Alcamo, I. Elson
12. Roderick Nairn, Matthew Helbert. Immunology for Medical Students. MOSBY, 2002
22. STAS, recommendations and methodological indications.

### B. Additional:

Teaching and learning methods used:

The subject of Microbiology, Virology, Immunology is taught in a classical manner: with lectures and practical classes. Lectures are delivered by lecturers of the department. In practical classes, students discuss the main and most difficult topics in an interactive manner, study smears with different microscopes, (light microscope with immersion, with contrast phase, with dark field, luminescent), make inoculations, identification of microbial culture, test susceptibility to antibiotics of an identified species, study and carry out immunological reactions, study biological material (immunologic serum for diagnostics and treatment, diagnostics, vaccines, eubiotics, allergens, etc), fill in the practical works notebook. If necessary the presentation of some images on a computer can take place. Special microbiology, studies clinical cases.

Suggestions for individual work:

1) Work with information sources:

- Read carefully notes of lectures or material in the text book on the given subject.
- Read the questions on subject that requires comprehension of the subject.
- Make a list of additional information sources (manuals, monographs, scientific articles, websites) on the given subject.
- Select additional information source on the given subject.
- Read the whole text carefully, outlining the main ideas.
- Formulate summaries and conclusions on the importance of the unit/subject.

2) Work with practical works notebook:

- Before you start accomplishing the tasks in your notebook, read (take notes of) the information and images from the corresponding unit in the lecture and manual.
- Solve the tasks consecutively.
- Formulate conclusions at the end of each class.
- Do not limit yourselves only to the information in the lecture and manual. Select additional information using websites and additional literature.

3) Familiarize with the main learning techniques and the steps to accomplish the given tasks:

**Observation**
- Identify elements characteristic of some biological phenomena or structures.
- Describe the elements of phenomena.

**Analysis**
- Decompose the whole into its parts in your imagination.
- Point out essential elements.
- Study each element as a part of the whole.

**Analysis of a scheme/figure**
- Select the information in need.
- On the basis of obtained knowledge and selected information study the structures shown in the scheme or picture.
- Analyze the studied functions/role of the structures.

Comparison
- Analyze the first object/process of a group and determine its main features.
- Analyze the second object/process of a group and determine its main features.
- Compare the objects/processes and specify their common features.
- Compare the objects/processes and determine the differences.
- Establish the differentiation criteria.
- Formulate conclusions.

Classification
- Identify the structures/processes for classification.
- Determine the criteria for classification.
- Distribute the structures/processes in groups according to the established criteria.

Development of a scheme
- Select the elements for the scheme.
- Present the chosen elements using various symbols/colors and indicate the relationship between them.
- Formulate and reconcile the title and legend of symbols used.

Modeling
- Identify and select elements to model the phenomenon.
- Present (graphically or schematically) the studied phenomenon.
- Accomplish the given phenomenon using the developed model.
- Formulate conclusions on the basis of arguments or findings.

Experiment
- Start with known facts, formulate a hypothesis on the studied process/phenomenon.
- Verify the hypothesis by accomplishing the studied processes/phenomena in lab conditions.
- Formulate conclusions on the basis of arguments or findings.

Evaluation methods:

The syllabus in microbiology virology immunology provides for tests to assess the acquired knowledge and practical skills during the course:

2. Infection and immunity (immunological reaction, biological materials + test + 3 short editorial questions)
4. Intestine infections (smears, culture mediums, biological material + test + 3 short questions)

The tests consist of 20 questions (simple and multiple choice)

Each task is assessed with grades from 0 to 10, with the calculation of averages. The final test evaluation can be taken twice, and a third time in the last week of the semester (assessment week). The annual average score is made up of the average scores.

Students with an average score under 5, as well as students who have not worked on all four tests or their absences from practical classes, are not admitted to the final examination in Microbiology with Virology and Immunology.

The examination will take place in two stages, each of them is an integral part:

I stage – ORAL EXAMINATION which includes 3 subjects in:
1. Morphology and Physiology of microorganisms
2. Immunology
3. Special Microbiology

II stage – CONTROL TEST (the test verified by the TestEditor software). Each version contains 100 tests: 40 simple choice tests (SC – with one correct answer) and 60 multiple-choice tests (MC – with 2, 3 or 4 correct answers).

The final score is calculated the following way: 50% of the annual average score (the average of grades of two semester tests), 20% of the control test score and 30% of the grade for the practical part.
The knowledge is assessed with grades from 10 to 1, without the use of decimal places. Grades from “5” to “10” obtained as a result of the assessment of the course, allow obtaining the credits provided for it, according to the plan. Students with grades for current evaluation lower than “5” are not admitted to the final examination. The ECTS European evaluation scale is applied:

- Mark 10 “excellent” is given for having acquired 91 – 100% of the material of the course;
- Mark 9 or „very good” is given for having acquired 81 – 90% of the material included of the course;
- Mark 8 or „good” is given for having acquired 71 – 80% of the material of the course;
- Mark 7 or „satisfactory” is given for having acquired 66 – 70% of the material;
- Mark 6 or „satisfactory” is given for having acquired 61 – 65% of the material;
- Mark 5 or „weak” is given for having acquired 51 – 60% of the material;
- Mark 4 or „unsatisfactory” is given for having acquired 41 – 50% of the material;
- Mark 3 or „unsatisfactory” is given for having acquired 31 – 40% of the material;
- Mark 2 or „unsatisfactory” is given to the student that cheated or obtained a minimum knowledge of the material, 21 – 30%.
- Mark 1 or „unsatisfactory” is given for a minimum knowledge of the material, 0 – 20% of the total.

Non-attendance of the final examination without any valid reason is registered as „absence” and equal to the score 0 (zero).

In case of failure the student has the right to two repeated examinations.

**Language of the course:** Romanian, Russian, English, French