SYLLABUS

Name of the department providing the course:

Department of Microbiology and Laboratory Medical Immunology
Chair of Clinical Immunology and Microbiology
Faculty of Medicine
Medical University of Lodz
Pomorska St. 251, 92-213 Lodz

Course title: BANGL – MD Advanced

Course profile: academic

Speciality: -

Level of course unit: master

1. **Course unit title:** Microbiology
2. **Course unit code:**
3. **Type of course unit:** compulsory

4. **Course aims:**
   To acquaint the student with: the taxonomy of microorganisms, physiological flora of the human body, characteristics of strictly pathogenic and opportunistic bacteria, the viruses pathogenic for humans, the mechanisms of bacterial and viral pathogenicity, the role of pathogens in the disease development, and the occupational threat associated with infectious agents.

   To acquaint the student with: the basic forms of interrelationship between the microorganism and the host, the methods of disinfection and sterilization, the aseptic and antiseptic techniques, antimicrobial therapy (antibiotics and chemotherapeutics), the rules of empiric and directed therapy, mechanisms of resistance to antimicrobial drugs among microorganisms, and the basic rules of the microbiological diagnostics.

5. **Form of study:** MD Advanced program

6. **Year of study:** 1st (summer semester)

7. **Types of educational activities and number of hours allocated:**
   Lectures - 8 hours
   Classes - 52 hours

8. **Number of ECTS credits allocated and their structure according to students' form of learning:** 6 (according to 60 didactic hours divided into lectures – 8 hours and classes – 52 hours).

9. **Names of course unit's faculty:**
   Course coordinator: Prof. Janina Grzegorczyk, PhD
   Course coordinator: Monika Bigos, PhD (classes and lectures)
   Assistant: Monika Łysakowska, PhD (classes and lectures)
   Assistant: Sylwia Moskwa, PhD (classes)

10. Prerequisites: Medical biology, biochemistry, physiology, and molecular biology

11. Learning activities and teaching methods: lectures and laboratory activities (classes)

12. Course unit content:

Lectures:
1. Introduction to Microbiology.
2. General Virology.
3. Herpesviruses.
4. Influenza Virus. Retroviruses (HIV and HTLV).

Classes:
1. General microbiology – bacteriological media, methods of the microbiological inoculation and cultivation, preparation of pure cultures, the structure of the bacterial cell, staining methods of the bacterial slides.
2. General microbiology – Physiology of microorganisms (diagnostic meaning). The influence of the physical and chemical factors on bacteria.
3. General microbiology – Genetics of microorganisms. Vaccines.
4. General microbiology – antibiotics and chemotherapeutics.
5. Virology – principles of diagnostics. **Colloquium no. 1 (C1-C4 and L1).**
6. Skin infections.
7. Infections of the respiratory system.
8. Infections of the digestive tract. Food poisoning.
9. Urogenital infections. **Colloquium no. 2 (C5-C8, L2, and L3).**
10. Sexually transmitted diseases.
11. Infections of the nervous system.
12. Bloodstream infections. Zoonoses. **Colloquium no. 3 (C9-C11 and L4).**
13. Hospital-acquired infections.

13. Course objectives:

Knowledge:

The student:

C.W11. knows the genetic mechanisms of resistance to antimicrobial agents among microorganisms;

C.W12. knows the taxonomy of the commensal and pathogenic microorganisms;

C.W13. knows the epidemiology of infections caused by the viruses and bacteria, including their geographical coverage;

C.W14. knows the influence of the abiotic and biotic (bacteria and viruses) environmental agents on the human organism and the human population, the modes of their transmission to the host; is able to describe the consequence of exposure to various chemical and biological factors, and the rules of prophylaxis;

C.W17. knows the signs and symptoms of iatrogenic infections, the modes of their transmission, and the pathogens infecting the particular internal organs of the human body;

C.W18. knows and understands the basics of the microbiological diagnostics;

C.W19. knows the basics of disinfection, sterilization, and aseptic techniques;

C.W20. knows the process of development and the activity of the immunological system, including nonspecific and specific mechanisms of the immunological response (humoral and cell-mediated immunity);

C.W26. knows the main mechanisms of the cell and tissue destruction during the infectious process;

C.W28. knows the definition of shock and its pathophysiology (is able to differentiate between SIRS, sepsis, septic shock, MODS);

C.W32. is able to present the list of pathogenic factors (external and internal, alterable and non-alterable);
C.W38. knows the main side-effects of the antimicrobial therapy, including interactions between various antimicrobial agents;
C.W39. understands the phenomenon of resistance to antimicrobial drugs, including multidrug resistance;

Skills:

The student:
C.U9. is able to prepare the microscopic slides and recognize the pathogens under the microscope;
C.U10. can interpret the results of the microbiological diagnostics;
C.U15. is able to plan the scheme of the rational antimicrobial therapy (empiric or directed);

After the microbiology course the student is able to:

- describe the structure of the bacterial cell and the viral particle, including the biological differences between them;
- list and characterize the bacterial and viral species being the main etiological factors of the human infections;
- explain the meaning of the following terms: reservoir of the pathogen, source of infection, modes of transmission, and the portals of entry for the infectious agents;
- describe the components and the application for the various vaccines and antiserum;
- find the correlation between the signs and symptoms of the given infectious disease and the view of the destroyed tissue and internal organs (on the basis of the physical examination of the patient and the results of the laboratory diagnostics);
- describe the consequences of the pathologic changes in various internal and external organs of the human body, and analyze the response of the human organism to destructive activity of the pathogen.

Attitudes and transferrable (generic) competencies:

The student:
- is able to make his/her own self-assesment of the skills and knowledge
- is interested in improving the skills and widening the knowledge
- is able to work as the member of the group and play various roles in this group
- is awake to his/her responsibility for his/her safety, and the safety of the environment, including the co-workers.

14. Required and recommended learning resources (readings):

Required:

Goering R.V., Dockrell H. M., Zuckerman M., Roitt I. M., Chiodini P. L.: „Mims'Medical Microbiology". 5th edition. Elsevier, 2012. ISBN: 9780723436010.

Recommended:

USMLE Step 1 Lecture Notes 2016 (978-1506200477) and 2017 (ISBN 9781506208367): Immunology and Microbiology (Part of USMLE Prep) by Kaplan and Kaplan Medical (for revision)

Brauncajs M., Krzemiński Z.: Medical Microbiology – Microscopic Slides and Media" (pdf); http://studymed.umed.pl/downloads-2/ (for revision)

Tilton R. C.: „Microbiology. PreTest USMLE step 1". 10th edition and any next. McGraw-Hill, 2002. DOI: 10.1036/0071389709.

15.Assessment methods and criteria:

Microbiology Course – Regulations for Students:

I. Regulations and Laboratory Safety Rules are presented to students at the beginning of the Microbiology Course and have to be strictly obeyed. Each student confirms his knowledge of them by a personal signature.

II. Students take part in lectures and compulsory classes in groups and on days according to the given schedule. Students must be punctual.

III. Each student may miss maximum 3 classes and the absences should be justified. Otherwise, the student has to repeat the Microbiology Course next academic year.

IV. Students are obliged to keep a copybook and have color pencils to make clear and legible notes and drawings from the practical part of each class. The instructor checks the notes after the class.

V. The white coat and the apron are obligatory. If the student has not got them, it is synonymous with being not prepared for the class. A student cannot take part in the class, and it is treated as absence. There is no possibility to borrow a white coat in our Department.

VI. The student has to be theoretically prepared for each class (necessary information published on the website of the MUL: http://studymed.umed.pl/downloads-2/). Student's knowledge is graded on each class (learning assessment questions); the results are recorded; these quizzes cannot be repeated. The student is obliged to know the whole material mentioned in the Syllabus and Microbiology Outline even if some issues were not touched on by the instructor.

VII. A series of classes finishes with the colloquium built of 20 MCQs. Three such tests are scheduled (I. Classes 1-4 and lecture 1; II. Classes 5-8 and lecture 2 and 3; III: Classes 9-11 and lecture 4). One basic attempt and two retakes for each test are scheduled. The student can obtain maximum 20 points from each colloquium (minimum to pass: 11 points). Non-excused absence on the colloquium, or non-accession to the colloquium results in the loss of time limit and obtain the mark failed. The sick leave certificate (original paper form!) must be presented, at the latest, within five working days after the underlying circumstances occurred.

Colloquium mark:

0-10 points –	2 (failed)
11-12 points –	3 (sufficient)
13-14 points –	3+ (satisfactory)
15-16 points –	4 (good)
17-18 points –	4+ (very good)
19 -20 points –	5 (excellent)

VIII. Appropriate behavior has to be obeyed during classes (including quizzes and tests) and exams. Talking, cheating, and using any electronic equipment (even as a watch) are forbidden! Otherwise, the student has to leave the class. Information of the blameworthy behavior is submitted to the Dean. The mobile phones, tablets, laptops etc. have to be kept in the students' cabinets during classes!

IX. To be prepared for the classes, tests, and exams, the student is obliged to use the recommended textbooks and instructor materials.

X. Only the classic wooden pencils (not propelling pencils!) should be used for the quizzes, and colloquia.

XI. The Term Credit will be given to students, who passed three colloquiums assigned for the term. If the student did not manage to do that before the Exam Session, he gets 2.0 (failed) from the 1st attempt of the Final Exam (NBME) and has to complete colloquium retakes before the 1st Retake Exam. To do that, he has only one retake (LAST Retake):

a) if he failed previously one colloquium – the LAST Retake will comprise 20 MCQs concerning only this colloquium;

b) if two colloquiums were previously failed – the LAST Retake will comprise 20 MCQs concerning these two colloquiums;
c) if three colloquiums were previously failed - the LAST Retake will comprise 20 MCQs concerning all these colloquiums.

If the student fails the LAST Retake he has to repeat the whole Microbiology Course next academic year.

XII. Form of the Final Exam: NBME (100 MCQs, 72sec/question); both retake exams: NBME (100 MCQs, 72sec/question). Each student is obliged to undergo Registration (www.med-edu.pl/nbme); he cannot sit to NBME Microbiology Final Exam without Registration! Non-excused absence on the examination results in the loss of one from three time-limits and obtain the mark failed. The sick leave certificate (original paper form!) must be presented, at the latest, within five working days after the underlying circumstances occurred.

The Final Mark:

91-100%	points: 5.0 (excellent)
81-90%	points: 4.5 (very good)
71-80%	points: 4.0 (good)
61-70%	points: 3.5 (satisfactory)
51-60%	points: 3.0 (sufficient)
0- 50%	points: 2.0 (failed)

The following basic Safety Rules should be observed at all times in the laboratory:

1. Before entering the laboratory, place all your things you do not need during classes (coats, bags, any electronic equipment etc.) in the cloak-room. You need to have 2x2 zł (cloakroom downstairs for clothes and big bags; cabinets near classrooms for handbags or laptops etc.). Keep your bench area free of extraneous materials such as papers, books, and any unnecessary equipment (use the shelf over the table for the necessary things, i.e. your notes, color pencils, etc.).
2. Wear a lab coat and apron while working in the laboratory to protect clothing from contamination or accidental discoloration by staining solutions. You are not allowed to take part in classes if you have not got the appropriate protective clothing. The laboratory shoes or covers for shoes are also obligatory (closed shoes should be worn at all times in the lab setting). You cannot leave the Department in the protective clothing!
3. Remember that you work with alive and virulent bacterial cultures. Do not place contaminated instruments, such as inoculating loops, needles, and pipettes, on bench tops. Loops and needles should be disposed of in designated containers.
4. Before entering the laboratory and when leaving the laboratory wash your hands with soap and water or disinfecting solution and dry them with paper towels. Those of you entering hospital work will find that handwashing is the greatest deterrent to accidental contamination of patients. The hospitalized patient is most susceptible to infection even from so-called nonpathogenic species. Keep fingers, pencils, and pens away from your mouth. Do not lick labels (use tap water).
5. Tie back long hair to minimize its exposure to open flames. Smoking Do not eat, or drink in the laboratory. Never apply cosmetics or insert contact lenses in the laboratory. Do not leave the Department wearing the apron and covers for shoes!
6. Carry cultures carefully if you have to move around the laboratory. Likewise, keep cultures on the bench tops when not in use. This serves a dual purpose: to prevent accidents and to avoid contamination of yourself and the environment. Avoid unnecessary movement around the laboratory to prevent distractions that may cause accidents.
7. Never remove media, equipment, or bacterial cultures from the laboratory. Doing so is absolutely prohibited! Do not throw any refuse into the sink. Containers for disposal of

materials will be provided by your laboratory instructor. Containers for the disposal of slides and pipettes will also be provided.

8. If an infectious material is poured over on the table, floor, a lab coat, etc., your instructor (who will disinfect it properly) must be called instantly! You can cover it with paper towels and saturate with disinfectant solutions. After 15 min. of reaction time, remove the towels and dispose of them in a manner indicated by the instructor.
9. Report accidental cuts or burns acquired in the laboratory to your instructor immediately. Immediate hand washing is required if contact with any of contaminated materials occurs.
10. Speak quietly. Work in a laboratory requires concentration, accuracy, and caution. Otherwise, you may be asked to leave the class what is synonymous with absence.
11. After classes your work-place must be cleared (turn off the burner, wipe the microscope objective lens, place the bottles with dyes, place all cultures and materials in the disposal area as designated by the instructor etc.). Disinfect your bench area after you have finished your experiment. Your laboratory bench area may be used by others and you would not want to accidentally contaminate them.
12. Before leaving the lab, wash your hands carefully using soap and disinfectant.

16. Additional information: janina.grzegorczyk@umed.lodz.pl monika.bigos@umed.lodz.pl

17. Statement and signature of the course leader:

I hereby state that the content of the curriculum included in the syllabus below is the result of my individual work completed as part of work contract/cooperation resulting from a civil law contract, and that author rights to this title are not the property of a third party.

18.Dean's signature: