



MICROBIOLOGY II - INSTRUCTIONS FOR WINTER SEMESTER

Dear colleagues,

The winter semester of your third year is about to begin, and with it comes Microbiology II. You can look forward to exploring the world of medically important microorganisms in greater depth, expanding your knowledge of bacteria, viruses and parasites. You will also learn to apply your knowledge of microorganisms and antimicrobial agents to infections affecting different organ systems.

At the end of the course, you will take your final examination in microbiology. Below, you will find an overview of the course organisation, credit requirements and examination procedures. If you have any questions or concerns, please contact me at jakub.hurych@lfmotol.cuni.cz.

Lectures

Lectures take place twice a week, usually in Small Left Hall (also Small Right and once SP1):

- Mondays, 9:50–11:30
- Tuesdays, 14:25–16:05

Please note that the first lecture will take place on **Tuesday, September 29, 2026, in Small Left Hall**.

There are no practical classes in Microbiology II, so we will only meet during lectures. We have organised the lectures into thematic blocks to allow more time for interaction, clinical case discussions and a deeper understanding of the topics.

Although lectures are not compulsory, we strongly encourage you to attend. Compared with textbooks, lectures provide clinical context and an opportunity to clarify difficult concepts directly with your teachers. Consider them an important part of your preparation for the final examination.

This semester, we will begin with atypical bacteria, followed by virology and parasitology. We will then move on to clinical microbiology, focusing on infections of individual organ systems. The final weeks will cover multidrug-resistant bacteria, reserve antibiotics and vaccination.

Important timetable changes: There will be no lecture on Tuesday, November 17, due to a national holiday. The lectures on October 5 and January 4 will take place in the Small Left Lecture Hall rather than SP1. The lecture on October 13 will take place in SP2.



FINAL LECTURES – EXAM ESSENTIALS

The last two lectures are dedicated to revising the most important topics before your final examination. We will revisit essential microbiological principles, highlight common mistakes and provide an opportunity to ask questions.

- January 11, 2027: Exam essentials I – bacteriology, clinical microbiology and antibiotics.
- January 12, 2027: Exam essentials II – parasitology, virology and microbiological methods.

We strongly encourage you to attend these sessions as part of your examination preparation.

Credit requirements

To obtain credit for Microbiology II, you must achieve a combined score of at least 20 points across three written tests.

Each test consists of 10 questions, with one point awarded for each correct answer. You will have 10 minutes to complete each test. No alternative dates are offered for the individual tests.

CREDIT TEST DATES

Test	Date	Associated lecture
Test 1	October 19, 2026	Parasitology III
Test 2	November 9, 2026	Respiratory Tract Infections I
Test 3	December 14, 2026	Skin and Soft Tissue Infections

Tests take place before the corresponding lectures.

If you fail to achieve the minimum combined score of 20 points, you may take a comprehensive resit test during credit week. This test consists of 30 questions, lasts 30 minutes and requires a minimum score of 24 points to pass.

Topics covered by the credit tests

1. General microbiology – general bacteriology, virology, mycology and parasitology; antimicrobial agents, their mechanisms of action and resistance; microbiological diagnostic methods, their advantages and limitations.
2. Special microbiology – bacteria, viruses, fungi and parasites, including their classification, pathogenicity, virulence factors, diagnostic methods and treatment options; the human microbiome and physiological microbiota.
3. Clinical microbiology – major pathogens responsible for infections of individual organ systems, including their diagnosis, treatment and prevention, within the scope of the lectures until the date of the lecture.



Consultations with teachers

You may arrange consultations with your teachers throughout the semester if you need help with any of the topics covered. All our teachers are happy to assist you. Ideally, please coordinate consultation requests with your teacher as a group.

Your group teachers from the previous semester are: Dr. Jakub Hurych and As.Prof. Oto Melter (jakub.hurych@lfmotol.cuni.cz; oto.melter@lfmotol.cuni.cz)

Final examination

Examination dates will be announced during the ninth week of the winter semester, in accordance with the Department's Examination Regulations, published on the Second Faculty of Medicine website.

The theoretical examination is oral. You will draw a set of three questions, covering the following areas:

1. General microbiology (Group I).
2. Special microbiology (Groups II–IV).
3. Clinical microbiology and microbiological diagnostic methods (Groups V and VI).

The complete list of examination questions is available in SIS.

Study materials

Lecture slides in PDF format will be made available throughout the semester in the Microbiology II course on Moodle.

Required textbooks:

- Murray P. et al.: Medical Microbiology, Elsevier, 2015.
- Melter O. and Castelhana R.: MicroBook – Clinical Microbiology for Medical Students, 2019.

Recommended textbooks:

- Lippincott's Illustrated Reviews: Microbiology, Lippincott Williams & Wilkins, 2012.
- Mims' Medical Microbiology and Immunology, Elsevier, 2018.

We hope you enjoy the second half of Microbiology and successfully complete your final examination. We wish you all the best for the upcoming semester and look forward to seeing you at our lectures!

On behalf of the teaching staff of the Department of Medical Microbiology,

Jakub Hurych, MD, Ph.D.

Deputy Head for Teaching



Syllabus

Week	Date	Start	End	Place	topic	Vyučující
1	29.09.2026	14:25	16:05	MLP	Atypical bacteria I: Mycoplasma and Chlamydia	Doc. MVDr. Oto Melter, Ph.D.
2	05.10.2026	9:50	11:30	MLP	Atypical bacteria II: spirochets, mycobacteria	Doc. MVDr. Oto Melter, Ph.D.
2	06.10.2026	14:25	16:05	MLP	Virology II: Herpesviruses	MUDr. Petr Hubáček, Ph.D.
3	12.10.2026	9:50	11:30	MLP	Parasitology I: Protozoa - 1st part	Doc. MVDr. Oto Melter, Ph.D.
3	13.10.2026	14:25	16:05	MLP	Parasitology II: Protozoa - 2nd part, Trematoda	Doc. MVDr. Oto Melter, Ph.D.
4	19.10.2026	9:50	11:30	MLP	TEST 1. Parasitology III: Cestoda, Nematoda	Doc. MVDr. Oto Melter, Ph.D.
4	20.10.2026	14:25	16:05	MLP	Sequencing in microbiology. Human microbiome, physiological microbiota	MUDr. Jakub Hurych, Ph.D.
5	26.10.2026	9:50	11:30	MLP	Neuroinfections	Doc. MVDr. Oto Melter, Ph.D.
5	27.10.2026	14:25	16:05	MLP	Virology III: Arboviruses; viruses of haemorrhagic fever	MUDr. Petr Hubáček, Ph.D.
6	02.11.2026	9:50	11:30	MLP	Virology IV: viruses of exanthematous diseases	MUDr. Petr Hubáček, Ph.D.
6	03.11.2026	14:25	16:05	MLP	Respiratory tract infections II: viral agents	MUDr. Petr Hubáček, Ph.D.
7	09.11.2026	9:50	11:30	MLP	TEST 2. Respiratory tract infections I: bacterial and fungal agents	Doc. MVDr. Oto Melter, Ph.D.
7	10.11.2026	14:25	16:05	MLP	GIT infections II: <i>Clostridioides difficile</i> infections (CDI)	Mgr. Marcela Krůtová, Ph.D.
8	16.11.2026	9:50	11:30	MLP	GIT infections I: viral, bacterial and parasitic agents + <i>E. coli</i> pathotypes and shigella	Doc. MVDr. Oto Melter, Ph.D.
8	17.11.2026	14:25	16:05	MLP	NO LECTURE (public holiday)	NA
9	23.11.2026	9:50	11:30	MPP	Introduction to HAI: Catheter Infection; Surgical Site Infections; Hospital-Acquired & Ventilator-Associated Pneumonia	Prof. RNDr. Alexander Nemec, Ph.D. et Ph.D.
9	24.11.2026	14:25	16:05	SP1	Bloodstream infections (BSI)	Prof. MUDr. Pavel Dřevínek, Ph.D.



10	30.11.2026	9:50	11:30	MPP	Urinary tract infections (UTI)	MUDr. Jakub Hurych, Ph.D.
10	01.12.2026	14:25	16:05	MLP	Sexually transmitted infections I: bacterial and parasitic agents	Doc. MVDr. Oto Melter, Ph.D.
11	07.12.2026	9:50	11:30	MPP	Sexually transmitted infections II: HIV & hepatitis viruses (HBV a HCV)	MUDr. Petr Hubáček, Ph.D.
11	08.12.2026	14:25	16:05	MLP	Infections in pregnancy and newborns	MUDr. Petr Hubáček, Ph.D.
12	14.12.2026	9:50	11:30	MPP	TEST 3. Soft tissue infections	MUDr. Anežka Gryndlerová
12	15.12.2026	14:25	16:05	MLP	Bone and joint infections	MUDr. Anežka Gryndlerová
13	04.01.2027	9:50	11:30	MPP	Multi-drug resistant bacteria & reserve antibiotics	Mgr. Jan Tkadlec, Ph.D.
13	05.01.2027	14:25	16:05	MLP	Vaccination from a microbiological perspective	Prof. MUDr. Pavel Dřevínek, Ph.D.
14	11.01.2027	9:50	11:30	MPP	Exam essentials #1 (bacteriology, clinical microbiology, antibiotics)	MUDr. Jakub Hurych, Ph.D.
14	12.01.2027	14:25	16:05	MLP	Exam essentials #2 (parasitology, virology, methods)	Doc. MVDr. Oto Melter, Ph.D.

* **MLP** = small left hall; **MPP** = small right hall; **SP1** = seminar room 1 (level -P, one floor above MPP and MLP).



Exam questions

Rules: combination of three questions from three groups:

1. General microbiology (subgroup I.)
2. Special microbiology (subgroups II.-IV)
3. Clinical Microbiology (subgroup V.) and Microbiological Methods (subgroup VI.)

I. General Microbiology (26 questions)

1. Cell wall composition of G+ and G- bacteria. Classification of bacteria.
2. Structure of bacterial cell and surface structure, bacterial spore.
3. Exotoxins and their classification according to mechanism and site of action.
4. The bacterial genome and its plasticity. Mobile genetic elements.
5. Structure of viral particles. Classification of viruses.
6. Pathogenesis of viral infections.
7. General mycology. Classification of micromycetes.
8. General parasitology. Classification of parasites.
9. Mechanisms of action of antibiotics.
10. Mechanisms of antibiotic resistance.
11. Reserve antibiotics
12. Principles of rational antibiotic therapy.
13. Penicillin antibiotics.
14. Generation I to V cephalosporins, carbapenems
15. Glycopeptides. Oxazolidinones (linezolid)
16. Antimicrobials with beta-lactamase inhibitors
17. Macrolide and lincosamide antibiotics.
18. Tetracyclines, including tigecycline. Chloramphenicol.
19. Aminoglycosides. Polypeptide antibiotics (polymyxin).
20. Quinolone antibiotics.
21. Cotrimoxazole. Metronidazole. Nitrofurantoin.
22. Antituberculosis.
23. Virostatics, including covid-19 treatment.
24. Antifungals.
25. Antiparasitics (emphasising antimalarials), including anti-infectives used to treat parasitic infections.
26. Side effects of antibiotics.

II. Special Virology and Mycology (19 questions)

27. Herpesviruses - HSV1, HSV2 and VZV.
28. Herpesviruses - EBV, CMV and HHV-6.
29. Influenza viruses.
30. Parotitis virus. Measles virus.
31. Rubella virus and parvovirus B19.
32. Rabies virus.

33. Adenoviruses.
34. Rotavirus. Caliciviruses.
35. Polioviruses and other enteroviruses.
36. Flaviviruses causing encephalitis
37. Viral hemorrhagic fever.
38. Papillomaviruses. Human pathogenic poxviruses.
39. RSV, parainfluenza viruses, rhinoviruses.
40. SARS-CoV-2 and other coronaviruses
41. Agents of viral hepatitis.
42. HIV and other retroviruses.
43. Yeasts (candida)
44. Filamentous micromycetes (aspergilli, mucormycetes, dermatophytes).
45. Cryptococcus. Pneumocystis.

III. Special bacteriology (33 questions)

46. *Staphylococcus aureus*.
47. Coagulase-negative staphylococci.
48. *Streptococcus pyogenes*.
49. Beta haemolytic streptococci other than *S. pyogenes*.
50. *Streptococcus pneumoniae* and oral streptococci.
51. Enterococci.
52. Neurotoxic clostridia.
53. Histotoxic clostridia.
54. *Clostridioides difficile*.
55. *Bacillus anthracis* and other bacilli.
56. *Listeria monocytogenes*.
57. Corynebacteria.
58. Actinomycetes and nocardia.
59. *Pseudomonas aeruginosa* and other G- nonfermenting rods.
60. Bordetella.
61. Brucella and *Francisella tularensis*. *Legionella pneumophila*.
62. *Campylobacter*. *Helicobacter pylori*.
63. *Haemophilus influenzae* and other haemophiles.
64. *Vibrio cholerae* and other vibrio.
65. *Escherichia coli*. Shigella.
66. Yersinia.
67. Salmonella (Typhi, Enteritidis and other serotypes).
68. *Klebsiella*. *Enterobacter*.
69. *Citrobacter*, *Serratia*, *Proteus* and *Providencia*.
70. *Neisseria meningitidis*.
71. *Neisseria gonorrhoeae*.
72. Anaerobic bacteria other than clostridia and actinomycetes.
73. *Treponema pallidum*.
74. Borrelia and leptospires.
75. Rickettsia, coxiellae, bartonellae.
76. Chlamydia.
77. Mycoplasmas and ureaplasmas.
78. Mycobacteria.



IV. Parasitology (11 questions)

- 79. Trypanosomes and leishmania.
- 80. *Giardia*. *Cryptosporidium*. *Trichomonas*.
- 81. *Entamoeba* and other amoeboid protozoa.
- 82. The causative agents of malaria.
- 83. *Toxoplasma gondii*.
- 84. Schistosomes.
- 85. Taeniae and other agents of intestinal cestodes.
- 86. Echinococci and other agents of tissue cestodes.
- 87. *Enterobius* and *Ascaris*. Other agents of intestinal nematodes.
- 88. *Trichinella* and other agents of tissue nematodes (including filariasis).
- 89. Ectoparasites.

V. Clinical Microbiology (18 questions)

- 90. The human microbiome. Physiological microbiota.
- 91. Upper respiratory tract infections.
- 92. Lower respiratory tract infections.
- 93. Diarrhoeal diseases.
- 94. Urinary tract infections.
- 95. Sexually transmitted infections.
- 96. Non-infectious (aseptic) neuroinfections.
- 97. Suppurative meningitis.
- 98. Blood-stream infections. The concept of sepsis.
- 99. Healthcare-associated infections.
- 100. Multi-resistant strains and treatment options.
- 101. Exanthemic diseases.
- 102. Skin and soft tissue infections.
- 103. Infection of bones and joints.
- 104. Infections caused by anaerobic bacteria.
- 105. Infection of the fetus and newborn.
- 106. Types of vaccines. Compulsory vaccination.
- 107. Recommended vaccinations and vaccinations at the request of the individual.

VI. Investigation procedures and diagnostics (12 questions)

- 108. Microbiological diagnosis of bacterial infections
- 109. Microbiological diagnosis of viral infections
- 110. Microbiological diagnosis of mycotic infections
- 111. Microbiological diagnosis of parasitic infections
- 112. Microscopy in the diagnosis of infectious diseases.
- 113. Cultivation of bacteria.
- 114. Procedures leading to the identification of bacteria.
- 115. Antibiotic susceptibility tests. Interpretation of results

- 116. Serological reactions (agglutination, ELISA, WB, immunochromatography).
- 117. Molecular biology methods and their advantages and disadvantages in the diagnosis of infectious diseases.
- 118. PCR and its use in the diagnosis of infectious diseases (including POCT mode).
- 119. Sequencing and its use in the microbiology laboratory.