

## REQUIREMENTS

<b>Semmelweis University, Faculty of Dentistry</b>
<b>Name of the course: General and oral microbiology</b> <b>Credit value: 4</b> <b>Lessons (<i>in hours</i>): 56 lectures: 28 practicals: 28 seminars:</b> <b>Type of the course: <u>compulsory</u> obligatory elective elective</b> <b>Frequency of announcement (<i>per semester or year</i>): per year</b>
<b>Academic year: 2022/2023</b>
<b>Subject code<sup>1</sup>: FOKOMIK350_1A</b>
<b>Lecturer of the course: Prof. Dóra Szabó</b> <b>Contact: Institute of medical microbiology, 201-2930/56101</b>
<b>The goals of the course in point of view of the education:</b> The General and Oral Microbiology includes the general microbiology, bacteriology, virology, mycology and parasitology, especially the microbial infections of oral cavity.
<b>Location of the course (<i>address of lecture hall, seminar room etc.</i>):</b> Lectures: NET-Brown Lecture Hall and NET-Green Lecture Hall, practices: NET L-09, L-10, L-11, L-12 laboratories. Address: 1089 Budapest Nagyváradi tér 4, 1 <sup>st</sup> floor
<b>Competences acquired by completion of the course:</b> By the end of the course the students will be able to understand the microbial background of the infectious diseases, treatment and specific prevention.
<b>Pre-study requirements and prerequisites of course registration and completion:</b> Microscopic anatomy II., Molecular Cell Biology I., Medical and Dental Physiology I.
<b>Number of students required for announcement of course (<i>min., max.</i>):</b> By registration in Neptun program.
<b>Method of course registration:</b> In Neptun program.
<b>Detailed course/lecture description<sup>2</sup>:</b> ( <i>to facilitate credit recognition in other institutions</i> ) <b>Lectures:</b> <ol style="list-style-type: none"><li>1. Introduction to microbiology. General bacteriology (morphology, physiology and cultivation of bacteria) Bacterial genetics.</li><li>2. Infections and diseases (pathogenesis of bacterial infection, virulence, importance of biofilm formation). Specific and non-specific host defences. Active and passive immunization.</li><li>3. Antibacterial chemotherapy (mode of actions, resistance, side effects).</li><li>4. Gram-positive facultative and obligate anaerobic cocci (<i>Staphylococci, Streptococci, Peptostreptococci</i>). Gram-negative facultative anaerobic, microaerophilic and obligate anaerobic cocci (<i>Neisseria, Moraxella, Veillonella</i>)</li><li>5. Gram-negative coccobacilli (<i>Haemophilus, Bordetella, Legionella</i>), Gram-positive aerobic rod (<i>Corynebacterium</i>), Gram-negative facultative anaerobic rods (<i>Enterobacteriaceae</i>)</li><li>6. Gram-positive spore-forming rods (<i>Bacillus, Clostridia</i>). Gram-positive anaerobic rods (<i>Actinomyces, Bifidobacterium, Lactobacillus, Propionibacterium</i>). Gram-negative anaerobic rods (<i>Bacteroides, Prevotella, Porphyromonas, Fusobacterium, Leptotrichia</i>).</li></ol>

7. Mycobacteria. Rickettsia, Chlamydia. Mycoplasma. Spirochetes (*Borrelia*, *Leptospira*, *Treponema*).
8. Medical importance of fungi (general mycology, chemotherapy of fungal infections).
9. Normal oral flora. Oral ecosystem and dental plaque. Microbiology of dental caries, periodontal diseases. Dentoalveolar infections. Candidiasis of oral cavity.
10. General properties of viruses. Antiviral chemotherapy. Poxviruses.
11. Hepatitis viruses (Hepatitis viruses A-E). Retroviruses (AIDS). Viruses and cancer.
12. Important respiratory pathogenic viruses (Adeno-, Influenza-, Parainfluenza viruses). Important enterally transmitted viruses (Calici- and Picornaviruses).
13. Arbo- and reovirus infection. Rabies. Slow viruses. Viral infections involving the oral, perioral tissues and salivary glands (Herpesviruses, Coxsackie-, mumps- and morbilliviruses).
14. Protozoa (general characterization and the most important human pathogenic protozoa: *Entamoeba*, *Trichomonas*, *Malaria*, *Toxoplasma*). Helminths (general characterization and the most important human worms: *Fasciola*, *Taenia*, *Enterobius*, *Ascaris*, *Trichinella*).

**Practices:**

1. Introduction to basic microbiology, laboratory rules.  
Microscopic examination of microbes
2. Cultivation of bacteria
3. Methods for sterilization and disinfection
4. Antibiotic susceptibility of microbes
5. In vitro antigen-antibody reactions (serological methods)
6. Gram-positive cocci
7. Gram-negative cocci
8. Enteric Gram-negative rods (*Enterobacteriaceae*), Gram-negative non-fermenting rods
9. Gram-negative coccobacilli, *Mycobacteria*
10. Gram-positive bacilli, Endospore-forming Gram-positive aerobic and anaerobic bacilli
11. Spirochaetes, Rickettsiae, Chlamydiae, Mycoplasma
12. Medically important fungi
13. General virology, Most important DNS and RNS viral diseases
14. Medical parasitology

**Courses (*obligatory and elective*) which in part or entirely overlap the topics of above course:**

No overlap

**Special academic work required for completion of the course<sup>3</sup>:**

Not required.

**Attendance on practices and lectures, replacement in case of missed sessions:**

In 75% the student must be present at the practices.

**Consequences of absence from sessions and exams:**

In accordance with the rules of the Neptun program.

**Method of checking acquired knowledge during the study period<sup>4</sup>:**

Two midterms during the semester.

**Requirements of an accepted semester (*signature of the lecturer*):**

The student must be present in 75% at the practices.

**Type of the exam:**

Answering at minimum questions (written) and oral exam.

**Requirements of the exam<sup>5</sup>:**

- I.
  1. History of medical microbiology. Classification of the microbes. The structure, the size and the shape of bacterial cell.
  2. Bacterial metabolism. The growth and reproduction of bacteria.
  3. Bacterial genetics. Mode of gene transfers.
  4. Microscopic examination of bacteria. Staining methods used in bacteriology.
  5. Sterilization
  6. Disinfection

7. Antimicrobial drugs that inhibit the nucleic acid synthesis and alter the membrane function.
8. Antimicrobial drugs that inhibit the cell wall synthesis
9. Antimicrobial drugs that inhibit the protein synthesis
10. Antibiotics used in combination.
11. The side effect of the antibiotics. The risk of antibiotic usage.
12. Antibiotic sensitivity tests in laboratory. Chemoprophylaxis. Antibacterial therapy.
13. Possible mechanisms of resistance against antibiotics
14. Pathogenicity and virulence. The measurement of the virulence
15. Toxic virulence factors of bacteria
16. Non-toxic virulence factors of bacteria.
17. Active immunisation. Obligatory vaccines.
18. Passive immunisation. The risk of the passive immunisation.
19. Antigen-antibody reactions used in laboratory.
20. Diagnosis of the infectious diseases.
21. Non-obligatory vaccines used against bacteria and viruses.
22. Characterization and classification of human pathogenic fungi.
23. Microbiological diagnosis of diseases caused by fungi.
24. Dermatomycosis (causative agents and diseases).
25. Systemic and opportunistic mycosis.
26. Mycotic infections of the oral cavity
27. Characterisation of the protozoa. Antiprotozoal drugs.
28. Leishmania
29. Toxoplasma
30. Plasmodia.

## II.

1. Staphylococcus genus
2. Streptococcus pyogenes.
3. Streptococci in the oral cavity. *S. mutans* and caries.
4. Streptococcus pneumoniae, Enterococcus faecalis, *S. agalactiae*, Peptostreptococcus.
5. Neisseria. Veillonella. Moraxella. Acinetobacter
6. Actinomyces, Bifidobacterium, Eubacterium.
7. Escherichia coli.
8. Klebsiella, Enterobacter, Serratia.
9. Salmonella and Shigella
10. Proteus, Pseudomonas
11. Campylobacter, Helicobacter. Vibrio
12. Corynebacterium. Listeria monocytogenes
13. Lactobacillus genus. Probiotics
14. Mycobacterium tuberculosis and bovis
15. Atypical mycobacteria, Mycobacterium leprae
16. Haemophilus, Legionella, Bordetella
17. Brucella and Francisella genus
18. Yersinia and Pasteurella genus.
19. Bacillus genus
20. Clostridia causing gas gangrene. *C. difficile*.
21. Clostridium tetani and Clostridium botulinum.
22. Treponema
23. Borrelia, Leptospira
24. Mycoplasmas, Chlamydiae.
25. Rickettsia
26. Bacteroides. Fusobacterium. Porphyromonas. Prevotella. Actinobacillus
27. Periodontal diseases caused by bacteria
28. Entamoeba histolytica. *E. gingivalis*, Trichomonas vaginalis, *T. tenax*

29. Fasciola hepatica, Tenia saginata, T. solium, Echinococcus granulosus  
30. Enterobius vermicularis, Ascaris lumbricoides, Toxocara canis, Trichinella spiralis).

### III.

1. Classification of viruses. Principles of virus structure. Chemical composition of viruses
2. Cultivation of viruses. Replication of viruses. The productive virus infection
3. Prophylaxis of viral diseases
4. Antiviral chemotherapy
5. Bacteriophages Subviral agents
6. Laboratory diagnosis of viral infections
7. DNA and RNA tumour viruses
8. Filoviruses
9. Adeno- and Poxviruses
10. Herpesviruses (HHV1, HHV2, VZV)
11. Herpesviruses (EBV, CMV, HHV6, HHV7, HHV8)
12. Papilloma and Parvoviruses
13. Picorna and Caliciviruses
14. Orthomyxoviruses and Coronaviruses
15. Paramyxoviruses ( RSV, Paramyxoviruses)
16. Paramyxoviruses (Mumps and Morbillivirus)
17. Rhabdoviruses
18. Togaviruses
19. Flaviviruses
20. Arena and Reoviruses
21. Bunyaviruses
22. Hepatitviruses (A, E)
23. Hepatitisviruses (B, C, D E, G)
24. Retroviruses and AIDS
25. Viral infections with oral manifestations.
26. Slow viral diseases
27. Nosocomial infections.
28. Characterisation of the helminths. Anthelmintic drugs.
29. Characterisation of zoonosis. Most important zoonotic infections.
30. Pre and perinatal infections and its causative agents.

#### **Grading of courses<sup>6</sup>:**

The student pick up a card with 3 exam questions and must answer each question at least to grade 2 (elégséges).

#### **Exam registration:**

By Neptun program

#### **Rules of repeating exams:**

By the rules of the Neptun

#### **List of textbooks, lecture notes and recommended textbooks:**

Szabó: Basics of Medical Microbiology. E-book, Semmelweis; 2022

Samaranayake: Essential Microbiology for Dentistry, 4th edition

Murray: Medical Microbiology, 6, 7, 8th editon

#### **Signature of course lecturer:**

#### **Signature of head of department:**

<b>Date of submission:</b>
<b>Opinion of OKB:</b>
<b>Notes from the Dean's Office:</b>
<b>Signature of Dean:</b>

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<sup>1</sup> Filled out by the Dean's Office following approval

<sup>2</sup> Detailed and numbered for each week of theoretical and practical lessons one by one, indicating the names of lecturers and instructors

<sup>3</sup> Eg. field practice, medical chart analysis, survey conducting, etc.

<sup>4</sup> Eg. homework, report, midterm exam etc. Topics, dates, method of retake and replacement.

<sup>5</sup> List of topics in case of theoretical exam, thematic and method in case of practical exam.

<sup>6</sup> Method of inclusion of theoretical and practical exams. Method of inclusion of midterm assessments.