Microbiology and oral microbiology

1. IMPRINT

Academic Year	2025/2026
Department	Faculty of Dental Medicine
Field of study / Subject	English Dentistry Division
Main scientific discipline	Medical sciences
Study Profile	General academic
Level of studies	Uniform MSc
Form of studies	Full-time studies
Type of module / course	Obligatory
Form of verification of learning outcomes	Exam after second semester
Educational Unit / Educational Units	Department of Dental Microbiology 1a Banacha, 02-097 Warszawa phone (22) 317 95 10

Head of Educational Unit / Heads of Educational Units	dr hab. n. med. Edyta Podsiadły
Course coordinator	dr hab. n. med. Edyta Podsiadły edyta.podsiadly@wum.edu.pl phone (22) 628 27 39
Person responsible for syllabus	dr hab. n. med. Edyta Podsiadły edyta.podsiadly@wum.edu.pl (mgr Adam Szeleszczuk)
Teachers	dr hab. n. med. Edyta Podsiadły; edyta.podsiadly@wum.edu.pl mgr Adam Szeleszczuk; adam.szeleszczuk@wum.edu.pl

2. BASIC INFORMATION

Year and semester of studies	II year, III and IV semester	**Number of ECTS credits**	5,5

FORMS OF CLASSES	**Number of hours**	**ECTS credits calculation**
Contacting hours with academic teacher		
Lecture (L)	14 (e-learning)	0,56
Seminar (S)	16	0,64
Discussions (D)	-	-
e-learning (e-L)	-	-
Practical classes (PC)	48	1,91
Work placement (WP)	-	-
Unassisted student's work		
Preparation for classes and completions	60	2,39

3. COURSE OBJECTIVES

C1	Student learns about the basic characteristics of microorganisms pathogenic for humans, laboratory diagnostic methods and the principles of sterilisation and disinfection in dental practice
C2	Student learns about physiological microflora of the oral cavity, etiology and pathogenesis of dental caries, microbiology of periodontal disease, systemic odontogenic infections
C3	Student learns about pathogenesis and epidemiology of infectious diseases and defence mechanisms of the host (specific and nonspecific)

C4	Student learns about chemotherapy of bacterial, fungal and viral infections, control of infections in dental practice and prophylaxis of infectious diseases

4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING

Code and number of effect of learning in accordance with standards of learning	Effects in time
Knowledge – Graduate* knows and understands:	
C.W1.	types and species and structure of bacteria, viruses, fungi and parasites, their biological characteristics and mechanisms of pathogenicity
C.W2.	physiological human bacterial flora
C.W3.	the basics of epidemiology of infections caused by bacteria, viruses, fungi and infections caused by parasites, and the pathways of their spread in the human body
C.W4.	species of bacteria, viruses, fungi and parasites, which are the most common etiological agents of infections and infestations
C.W5.	basics of disinfection, sterilization and aseptic management
C.W6.	disease risk factors: external and internal, modifiable and non-modifiable
C.W10.	the phenomenon of formation of drug resistance
C.W22.	principles of local and general therapy of infections caused by bacteria, viruses, fungi and infections caused by parasites
E.W9.	the principles of immunization against infectious diseases in children and adults
C.W23.	principles of local and general antibiotic therapy and scientific recommendations for prevention and control of infections, including the use of antibiotics and antiseptics in daily dental practice
E.W15.	principles of immunization against infectious diseases occurring in different groups of patients
Skills– Graduate* is able to:	
C.U1.	collect an appropriately selected type of biological material for microbiological testing depending on the location and course of the infection
C.U2.	interpret the results of microbiological, serological and antibiogram tests
C.U3.	select and perform tests indicating the number of bacteria in body fluids

5. ADDITIONAL EFFECTS OF LEARNING

Number of effect of learning	Effects of learning in time
Knowledge – Graduate knows and understands:	
K1	-
Skills – Graduate is able to:	
S1	-
Social Competencies – Graduate is ready for:	
SC1	-

6. CLASSES

Form of class	Class contents	Effects of Learning
Lectures (L)		
Lecture 1 and 2	L 1,2 – Lecture 1 and 2 – – Genera, species and structure of bacteria, their biological features and mechanisms of pathogenicity. (Part 1)	C.W1., C.W4.
Lecture 3 and 4	L 3,4 – Lecture 3 and 4 – – Genera, species and structure of bacteria, their biological features and mechanisms of pathogenicity. (Part 2)	C.W1., C.W4.
Lecture 5 and 6	L5,6 – Lecture 5 and 6 – Genera, species and structure of fungi, their biological characteristics, antimycotics.	C.W1., C.W4., C.W22.
Lecture 7 and 8	L 7,8 – Lecture 7 and 8 – Genera, species and structure of fungi, their biological characteristics, antimycotics.	C.W1., C.W4.
Lecture 9 and 10	L 9,10 – Lecture 9 and 10 – General properties of viruses. Virus structure. Virus classification. Phases of viral replication. Characteristics of stages of viral infections. Definitions related to the course of viral infections. Pathogenesis and epidemiology of viral infections. Viral pathogenicity factors. Groups of antiviral drugs. (DNA viruses)	C.W1., C.W4., C.W6.
Lecture 11 and 12	L 11,12 – Lecture 11 and 12 – General properties of viruses. Virus structure. Virus classification. Phases of viral replication. Characteristics of stages of viral infections. Definitions related to the course of viral infections. Pathogenesis and epidemiology of viral infections. Viral pathogenicity factors. Groups of antiviral drugs. (RNA viruses) Characteristics of prions as pathogenic agents and prion diseases.	C.W1., C.W4., C.W6.
Lecture 13 and 14	L 13,14 – Lecture 13 and 14 – Microbiology of periodontal diseases. Classification of periodontal and gingival diseases. Characteristics of microorganisms important in the development of periodontal diseases. Bacterial complexes in subgingival biofilm. Pathomechanism of periodontal diseases. Microbiological diagnostics and treatment guidelines.	C.W1., C.W4., C.W6., C.W23.

Seminars (S)		
Seminar 1	S1 – Seminar 1 – Exogenous and endogenous infections. Passive and active prophylaxis of viral and bacterial infections. Types of vaccines used in anti-infective prophylaxis. Mandatory and recommended vaccinations. Characteristics of preparations used for immunization against viral infections.	C.W6., E.W15.
Seminar 2	S2 – Seminar 2 – 2a. Oral microbiota. Physiological niches distinguished within the oral cavity. Species composition of biofilms inhabiting individual microenvironments. Characteristics of species classified as oral microbiome. Age-dependent changes in microflora composition. 2b. Etiology and pathogenesis of dental caries. Causes of the formation of carious lesions. Characteristics of microbial species important in the formation of carious lesions. Types of caries. Prevention of the formation and progression of carious lesions.	C.W2., C.W4.
Seminar 3	S3 – Seminar 3 – 3a. Role of microorganisms in the etiopathogenesis of periodontal diseases 3b. Systemic odontogenic infections. Definition of odontogenic infection. Types of infections associated with dental and gingival diseases. Characteristics of systemic odontogenic infections.	C.W2., C.W4.
Seminar 4	S4 – Seminar 4- Chemotherapy of bacterial infections in dental treatment. Mechanisms of resistance.	C.W22., C.U2.
Seminar 5	S5 - Seminar 5 – Definitions related to epidemiology of infections. Routes of transmittion of bacterial infections. Factors of bacterial pathogenesis. Systemic infections in dental practice - epidemiology and diagnosis. Infections associated with dental procedures. Routes of transmittion of infections. Infection control in dental practice	C.W3
Practical classes (PC)		
Practical class 1	PC1 - Principles of bacteriological diagnostics. Methods of isolation and identification of bacteria. Bacterial staining techniques. Culture methods and bacterial identification. Basic laboratory safety principles in microbiology.	C.U1., C.U2., C.U3.
Practical class 2	PC2 - Sterilisation and disinfection. Hand hygiene of the medical personnel. Methods of sterilization and disinfection of medical equipment, instruments and rooms. Control of sterilization and disinfection processes. Proper hand hygiene.	C.W3., C.W5.
Practical class 3	PC3 - Gram-positive bacteria Characteristics of microorganisms belonging to Gram-positive bacteria. Methods of laboratory diagnostics of clinically relevant species. *Corynebacterium, Listeria spp.* Antibiotic susceptibility and main antimicrobial groups used in therapy.	C.W1., C.W4., C.U2., C.U3.
Practical class 4	PC4 - Gram-negative bacteria. Characteristics of species belonging to aerobic fermenting and non-fermenting bacilli - epidemiology and diagnostics. MIcroaerophilic and capnophilic bacteria. Antibiotic susceptibility and main antimicrobial groups used in therapy.	C.W1., C.W4., C.U2., C.U3.
Practical class 5	PC5 – Atypical bacteria. Basic serological methods applied in microbiology.	C.W1., C.W4., C.U2., C.U3.

	Methods of laboratory diagnosis of infections caused by spirochaete, rickettsiae, mycoplasmas and chlamydiae	
Practical class 6	PC6 - Anaerobic bacteria vital in dental practice. Classification of anaerobic bacteria. Characteristics of clinically relevant anaerobes. Infections caused by anaerobic bacteria.	C.W1., C.W4., C.U2., C.U3.
Practical class 7	PC7 - Chemotherapy of bacterial infections in dentistry. Methods of assessing susceptibility to antimicrobial drugs. Mechanisms of bacterial resistance to antibiotics. Methods of evaluating susceptibility to antibacterial agents. Alert strains.	C.W10., C.W22., C.U2.
Practical class 8	PC8 - Bacteria of the genera *Mycobacterium* Systematics of bacteria of the genera *Mycobacterium*. Epidemiology, diagnosis and treatment of *Mycobacterium* infections.	C.W1., C.W4., C.U2.
Practical class 9	PC9 - Fungal infections, including oral fungal infections. Characteristics of clinically important fungal species. Antifungal agents. Epidemiology, diagnostics and treatment of fungal infections..	C.W1., C.W3., C.W4., C.U1., C.U3.
Practical class 10	PC10 – Characteristics and laboratory diagnostics of viral infections: HIV, HCV, HBV, HPV, EBV, HSV, CMV.	C.W1., C.W4., C.U1., C.U2., C.U3.
Practical class 11	PC11 – Viral and bacterial respiratory infections – characteristics of pathogens causing respiratory infections. Epidemiology. Diagnostics, treatment and prevention.	C.W1., C.W4., C.U1., C.U2., C.U3.
Practical class 12	PC12 – Gastrointestinal tract infections: etiological agents, diagnostics, treatment. Urinary tract infections: etiological agents, diagnostics, treatment.	C.W1., C.W4., C.U1., C.U2., C.U3.
Practical class 13	PC13 – Cardiovascular and nervous system infections: etiological factors, diagnosis, treatment. Osteoarticular system infections: etiological factors, diagnosis, treatment.	C.W1., C.W4., C.U1., C.U2., C.U3.
Practical class 14	PC14 – Clinical microbiology in practice – case study analysis using classical lab techniques and modern educational tools.	C.W1., C.W4., C.U1., C.U2., C.U3.
Practical classes 15/16	PC15/16 - Review of the course. Credit for practical classes.	C.W1–C.W6., C.U1–C.U3.

7. LITERATURE

Obligatory

1. **Essential Microbiology for Dentistry. L. P. Samaranayake. Elsevier, 6th edition, 2024.**
2. **Medical Microbiology. P. R. Murray, K. S. Rosenthal, M. A. Pfaller. Elsevier, 9th edition, 2020.**

Supplementary

1. Atlas of Oral Microbiology: From Healthy Microflora to Disease Xuedong Zhou, Yuqing Li. Springer Singapore, 2nd edition, 2021
1. Review of Medical Microbiology and Immunology;Ed. W. Levinson. Lange, 16th edition, 2020.
2. Human virology. L. Collier, P. Kellam, J. Oxford. Oxford University Press, 5th edition, 2016.
3. Oral Microbiology, 6th Edition; D. Marsh & Michael A.O. Lewis & Helen Rogers & David Williams & Melanie Wilson, 2016

8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
C.W1.- C.W6., C.W9., C.W20., E.W9., F.W3., F.W13., C.U1.- C.U3., F.U14.	1.Intermediate test (4 per year - 2 intermediate in semester 1 and 2 intermediate in semester 2). The dates of the intermediate tests are set at the beginning of each semester in consultation with the students. The head of the year is responsible for agreeing on convenient dates and submitting them to the lecturer no later than the end of the second week of classes.	1. Threshold number of points: 11/20 Scores and marks: <11,0/20 – 2.0 (failed) 11,0-12,0/20 – 3.0 (satisfactory) 13,0-14,0/20 – 3.5 (more than staisfactory) 15,0-16,0/20 – 4.0 (good) 17,0-18,0/20 – 4.5 (more than good) 19,0-20,0/20 – 5.0 (very good)
	2. Credit for practical classes.	2. Assessed for credit
	3. Final exam (80 MCQ), single choice, 1 correct answer.	3. Threshold number of points: > 45/80 Scores and marks: ≤45/80- 2,0 (failed) 46-51/80 - 3,0 (satisfactory) 52-58/80 - 3,5 (more than satisfactory) 59-65/80 - 4,0 (good) 66-73/80 - 4,5 (more than good) 74-80/80 - 5,0 (very good)

9. ADDITIONAL INFORMATION

1. Lectures are conducted in seven cycles of two lectures each. Lectures are delivered synchronously via the MS Teams platform. Attendance and familiarity with the lecture content are mandatory and are verified during intermediate tests. Completing online lectures requires active presence for at least 50% of the session duration.
2. Seminars are held in person. Attendance at all seminars is mandatory and is confirmed via attendance lists.
3. To pass the course, participation in all lectures, seminars, and practical classes is required.
4. Rules for making up absences: In exceptional cases (e.g., excused absence due to illness confirmed by a medical certificate), the student is required to make up the seminar or lecture cycle in the form of a written report within one week from the absence. A scan of the medical certificate should be sent by email to the Secretariat of the Department of Oral Microbiology (email: zms1@wum.edu.pl) no later than 7 days from the date of absence. One excused absence per seminar and one per lecture cycle is allowed.
5. Each student is required to prepare and present at least one presentation/report during a seminar on a topic consistent with the assigned seminar theme.
6. To be admitted to the final exam, students must pass all intermediates and practical assessments. Students who fail an intermediate or practical assessment are entitled to one retake.
7. The final exam may be held before the exam session. Students who receive a failing grade in the final exam are entitled to one retake.
8. Course coordinator: Dr. hab. n. med. Edyta Podsiadły, tel. +48 22 317 95 10
9. Practical classes take place in the exercise room of the Department of Oral Microbiology, Banacha 1a – Block E, 1st floor.
10. Seminars take place in seminar rooms at Pawińskiego 3C.

ATTENTION

The final 10 minutes of the last class in the block/semester/year should be allocated to students' Survey of Evaluation of Classes and Academic Teachers