



**“CAROL DAVILA” UNIVERSITY  
OF MEDICINE AND PHARMACY BUCHAREST**  
**Faculty of Dentistry**  
**Dental Medicine in English**



## DISCIPLINE GRID

### 1. Programme:

1.1.	<b>CAROL DAVILA UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST</b>
1.2.	<b>FACULTY OF DENTISTRY/2<sup>nd</sup> DEPARTMENT</b>
1.3.	<b>DIVISION: MICROBIOLOGY</b>
1.4.	<b>STUDY DOMAIN: Health, sectoral regulated within European Union</b>
1.5.	<b>STUDY LEVEL: LICENCE</b>
1.6.	<b>STUDY PROGRAMME: DENTAL MEDICINE IN ENGLISH</b>

### 2. Discipline:

2.1.	<b>DISCIPLINE NAME: MICROBIOLOGY</b>						
2.2.	<b>LOCATION: D. Gerota Str., No. 19-21, Bucharest</b>						
2.3.	<b>Lectures tenure: Prof. Gabriela BĂNCESCU</b>						
2.4.	<b>Practical classes tenure: Teaching assistant Carmen DEFTA, Teaching assistant Lidia SFETCU/ Teaching assistant Bogdan DABU and Assoc. Prof. Gabriela-Loredana POPA.</b>						
2.5. Study year	<b>II</b>	2.6. Semester	<b>III</b>	2.7. Evaluation	<b>Exam</b>	2.8. Type of discipline	<b>CD/FD</b>

### 3. Estimated total time (hours/semester)

No. hours/week	<b>5</b>	out of which	<b>Lectures: 2</b>	<b>Laboratory session: 3</b>
Total hours out of learning schedule	<b>70</b>	out of which	<b>Lectures: 28</b>	<b>Laboratory sessions: 42</b>

Time distribution	hours
<b>Textbook study, lecture support, bibliography and notes</b>	<b>15</b>
<b>Supplementary documentation activity in the library, on online platforms</b>	<b>15</b>
<b>Practical activity support material, homework, portfolio and essays</b>	<b>15</b>
<b>Tutorial activity</b>	<b>0</b>
<b>Examinations</b>	<b>1</b>
<b>Other activities</b>	<b>9</b>
<b>Total hours of individual study</b>	<b>55</b>
<b>Total hours per semester</b>	<b>125</b>
<b>Credits</b>	<b>5</b>

### 4. Preconditions

<b>4.1. curriculum</b>	General knowledge of immunology
<b>4.2. proficiencies</b>	Not required

## 5. Conditions

<b>5.1. for lecture activity</b>	Amphitheatre with 120 seats, desk, 2 chairs, blackboard, video projector, laptop, projection screen.
<b>5.2. for laboratory activity</b>	<p>Two rooms for laboratory sessions; work tables with surfaces that can be decontaminated equipped with plugs connected to the electrical network and Bunsen bulbs connected to the gas network; sinks connected to running water; 25 laboratory chairs/room, blackboard, whiteboard markers, laptop, video projector and projection screen. Storage cabinets for laboratory materials. Cloakroom/hallway with coat rack.</p> <p>Two bio-safety hoods, binocular microscopes, refrigerators and freezers, 2 incubators, analytical balance, sterilization apparatus, centrifuges, vortex and other laboratory equipment needed for laboratory work.</p> <p>Laboratory glassware, bacteriological loops, culture media, cedar oil, smear stain solutions, other reagents and biological products needed for laboratory work.</p> <p>Disinfectant and antiseptic solutions and protective equipment: working gowns, oronasal masks and protective gloves.</p>

## 6. Accumulated skills

<b>6.1. Proficiencies</b> <i>(knowledge and abilities)</i>	<p><b>I. Knowledge (cognitive dimension)</b></p> <ul style="list-style-type: none"> <li>- Understand the concept of the holobiont as it relates to the human being and the major role played by microorganisms in maintaining health as well as causing oral infections and other diseases.</li> <li>- Understand the relationship between microorganisms and host anti-infective defence.</li> <li>- Learning the basic concepts related to the appropriate use of the antibiotics and be aware of the risk of their misuse.</li> <li>- Understand the need to prevent contamination of macroorganisms with pathogenic microorganisms both in dental practice and in the community environment and know how to achieve prevention.</li> </ul> <p><b>II. Abilities (functional dimension)</b></p> <ul style="list-style-type: none"> <li>- Ability to perform decontamination of surfaces/objects and antisepsis of tegument.</li> <li>- Ability to collect relevant clinical samples from oral and maxillofacial infections.</li> <li>- Ability to perform smears/native preparations from clinical specimens collected from the oral and maxillofacial region and examine them microscopically.</li> <li>- Ability to perform some rapid microbiological tests using commercial kits.</li> <li>- Ability to interpret the results of microbiological tests (including antibiotic susceptibility testing of bacterial strains) and serological tests.</li> </ul>
<b>6.2. Transversal skills</b> <i>(role, professional and personal development )</i>	<p><b>III. Role skills</b></p> <ul style="list-style-type: none"> <li>- Understand the importance of collaboration between dentists - doctors of different specialties - health authorities (through information, exchange of ideas, transfer of knowledge, etc., on: diagnosis, treatment and prophylaxis of oral and extra-oral infections), in epidemiological context and under usual conditions.</li> <li>- Develop the ability to communicate with patients on infectious pathology problems, adapting academic language to their level of understanding.</li> <li>- Develop their ability to train the staff they will supervise and to verify the application of universal precautions and the sterilisation of instruments.</li> </ul> <p><b>IV. Professional and personal development skills</b></p> <ul style="list-style-type: none"> <li>- Develop the ability to effectively use available conventional and modern technology, information sources and assisted training resources.</li> <li>- Develop the capacity for professional self-improvement and creativity and the ability to integrate into a scientific research team.</li> </ul>

## 7. Objectives (based on the grid of acquired specific skills)

<b>7.1. General Objective</b>	<ul style="list-style-type: none"> <li>- To provide in-depth knowledge of oral microbiology and basic general microbiology necessary for the training of future dentists.</li> <li>- To provide in-depth knowledge of the oral microbiome and understanding of how interactions between microorganisms and host in the oral cavity are reflected in health status and disease occurrence.</li> </ul>
<b>7.2. Specific Objectives</b>	<ul style="list-style-type: none"> <li>- Providing knowledge on the general characteristics of: bacteria, fungi, parasites and viruses involved in human diseases, especially in oral infections.</li> <li>- Explaining the importance of oral microbiota in health and disease.</li> <li>- Providing basic knowledge on microbiological diagnosis, prophylaxis and treatment of different infections, especially of oral infections.</li> <li>- Providing knowledge about biological products used in the diagnosis, prophylaxis and therapy of infectious diseases.</li> <li>- Providing awareness about bacterial resistance to antibiotics.</li> <li>- Awareness of dental students about the risk of cross-infection in dental practice and the importance of applying standard precautions to prevent infections.</li> </ul>

## 8. Content

8.1. Lectures	No. hrs/topic	Teaching method	Obs.
1. Introduction to microbiology. Classification of microorganisms. Essentials of microbial taxonomy.	2	<b>Interactive teaching with power point presentation</b>	
2. Bacterial structure and morphology.	2		
3. Basic bacterial physiology and genetics.	2		
4. Relationships bacteria - human host. Bacterial pathogenicity and basic of host anti-infective defence.	2		
5. Biological products for prophylaxis and treatment of infections. Antibiotics: definition, classification, mechanism of action. Main classes of antibiotics. Mechanisms of bacterial resistance to antibiotics.	2		
6. General characteristics of the oral ecosystem. Microbiota of the oral cavity. Dental plaque: structure and stages of formation. Effects of oral biofilms.	2		
7. The role of bacterial plaque in the development of dental caries and periodontitis. Species/genera of anaerobic non-sporulating bacteria involved in various other oral infections: periimplantitis, endodontic and dentoalveolar infections, etc.	2		
8. Gram-positive cocci species of medical importance: general characteristics and infections produced. Oral streptococci - aspects of involvement in pathology.	2		
9. Gram-negative cocci species of medical importance: general characteristics and infections produced. Spiral-shaped bacteria found in the oral cavity. Oral treponeme species - implications in oral pathology. <i>T. pallidum</i> - general characteristics and infection produced.	2		
10. HACEK group and aerobic and facultative anaerobic Gram-negative bacilli species/genera of broad interest in human pathology - general characteristics and infections produced.	2		
11. Spore-forming and non-spore-forming Gram-positive bacilli, acid-fast bacilli and actinomycetes: general characteristics and involvement in human pathology.	2		
12. Fungi found in the oral cavity. <i>Candida albicans</i> - general characteristics and implications in oral pathology.  Protozoa with oral habitat: <i>Entamoeba gingivalis</i> and <i>Trichomonas tenax</i> - general characteristics and implications	2		

in oral pathology. Other examples of parasites and their implications in human pathology.			
13. Viruses involved in human pathology: general characteristics, morphology, structure and replication. Virus-host relationships and basics of pathogenesis of viral infection. Aetiological agents of acute viral rhinopharyngitis, influenza viruses, Measles virus, Rubella virus and SARS-CoV-2: taxonomy, structure, transmission routes and infections produced. Herpes viruses: taxonomy, structure, transmission routes and infections produced.	2		
14. Viral stomatitis - classification and viruses involved in their pathogenesis. Human immunodeficiency virus (HIV), Hepatitis B virus and Hepatitis C virus: taxonomy, structure, transmission routes and infections produced. Significance of immunological markers in hepatitis B.  Sources and routes of transmission of microorganisms in dental practice.	2		

8.2 Laboratory Sessions	No. hrs/topic	Teaching method	Obs.
1. Presentation of the microbiology laboratory and its material base. Organisation and operation of the microbiology laboratory. Method of aseptic work and rules on work protection in the microbiology laboratory.	3	<ul style="list-style-type: none"> <li>- <b>Interactive teaching with power point/video film presentation;</b></li> <li>- <b>Teacher's laboratory demonstration.</b></li> </ul>	
2. Disinfection and antisepsis - definition, examples of disinfectants and antiseptics. Sterilisation: definition, methods, indications and sterilisation control.	3		
3. Principles of microbiological sample collection and transport. Examples of microbiological samples collected from the oral cavity and clinical specimens collected from various infections for microbiological investigation. Techniques for smearing clinical samples. Methylene blue staining technique.	3		
4. Differential smear staining techniques: Gram technique and Ziehl-Neelsen technique. Description of the components of the binocular bright field microscope. Microscopic examination of stained smears performed from biological samples/clinical specimens collected from the oral cavity and various extra-oral infections.	3		
5. Cultivation of bacteria. Culture media: definition, classification, examples. Techniques for seeding clinical samples on culture media and techniques for isolating bacterial strains. Aspects of culture on liquid and solid media.	3		
6. Microbial identification techniques. Antibigram: definition, methods, reading and interpretation.	3		
7. Antigen-antibody reactions for diagnosis: classification and principle. Examples of antigen-antibody reactions used in the diagnosis of infectious diseases - reading and interpretation. Examples of biological products used in antigen-antibody reactions for diagnosis.	3		
8. Basics of laboratory diagnosis of <i>S. aureus</i> and <i>S. pyogenes</i> infections. Basics of identification of oral streptococcal species.	3		
9. Basics of identification of <i>N. meningitidis</i> and <i>N. gonorrhoeae</i> . Basics of laboratory diagnosis of syphilis. Basics of isolation and identification of anaerobic Gram-negative bacilli species/genera involved in oral infections.	3		

10. Basics of isolation and identification of aerobic and facultative-anaerobic Gram-negative bacilli species/genera of wide medical interest, as well as Gram-negative bacilli/cocobacilli species frequently involved in oral pathology (e.g. <i>Aggregatibacter actinomycetemcomitans</i> ).	3		
11. Basics of identification of <i>M. tuberculosis</i> , <i>C. diphtheriae</i> , <i>B. anthracis</i> and some species of clostridia with a role in human pathology. Basics of laboratory diagnosis in cervicofacial actinomycosis.	3		
12. Basics of laboratory diagnosis of oral candidiasis. Basics of methods used in laboratory diagnosis of parasitosis. Examination of microscopic preparations of protozoa and macroscopic examination of formalin-preserved helminths (e.g. <i>Taenia</i> spp., <i>A. lumbricoides</i> , <i>E. vermicularis</i> ).	3		
13. Rules for the collection and transport of clinical samples for laboratory diagnosis of viral diseases. Methods of virus culture. Methods of virological and serological diagnosis. Basics of laboratory diagnostic in hepatitis B and HIV infection.	3		
14. Review/reworking of laboratory sessions/practical exam.	3		

### 8.3. Bibliography for lectures and laboratory/practical sessions

1. Băncescu G. Microbiology - lecture for students of the Faculty of Dentistry, UMFCU [booklet/electronic version]. Bucharest, 2023.
2. Green LH, Goldman E. Practical handbook of microbiology, ed. 4. Boca Raton: CRC Press, 2021.
3. Hewlett MJ, Camerini D, Bloom DC. Basic virology, ed. 4. Hoboken: Wiley-Blackwell, 2021.
4. Leventhal R, Cheadle RF. Medical parasitology: a self-instructional text, ed. 7. Philadelphia: F. A. Davis Company, 2020.
5. Marsh PD, Lewis MAO, Rogers H, Williams DW, Wilson M. Marsh and Martin's Oral microbiology, ed. 6. Edinburgh: Elsevier, 2016.
6. Procop GW, Church DL, Hall GS, Janda WM, Koneman E, Schreckenberger PC. Koneman's Color atlas and textbook of diagnostic microbiology, ed. 7. Philadelphia: Lippincott Williams & Wilkins, 2016.
7. Samaranyake L. Essential microbiology for dentistry, ed. 5. Edinburgh: Elsevier, 2018.
8. Zhou X, Li Y. Atlas of oral microbiology: from healthy microflora to disease, ed. 2. Singapore: Springer, 2020.

## 9. Corroborating the contents of the discipline with the expectations of epistemic community representatives, professional associations and employers in the fields representative for the program

Because microbiology is a broad science and students of the Faculty of Dentistry have only one semester of study for this, the Microbiology Discipline offers them synthetic lectures and laboratory activities focused on what is strictly necessary for the training of future dentists. Overlap with lectures focused on oral infections taught in other disciplines of the Faculty of Dentistry has been avoided. While in other disciplines, students acquire in-depth knowledge of the clinical picture, treatment and prophylaxis of various oral infections, the Microbiology discipline focuses on providing knowledge of: the normal flora of the oral cavity, the general characteristics of bacteria, fungi, parasites and viruses of interest to dentists, understanding the mechanisms of microbial pathogenicity and the importance of the host - microorganism relationship in health and disease (in-depth notions of immunology being provided by another discipline). Students have the opportunity to acquire skills in: applying decontamination techniques, collecting and transporting microbiological samples, performing some microbiological techniques and interpreting microbiological and serological test results. Students also receive information on newly recognized infectious agents (e.g. SARS-CoV-2) and up-to-date information on

conventional and modern laboratory tests used in the diagnosis of oral and extra-oral infections. Students are encouraged to participate in the Circle of Microbiology organized by the Microbiology Discipline, with the opportunity to get involved and acquire skills for research work already in the preclinical years of study. The knowledge and skills acquired in the lectures and laboratory sessions of Microbiology are of great importance in the comprehensive training of future dentists.

## 10. Evaluation

10.1 Evaluation			
Activity type	Evaluation Criteria	Methods of evaluation	% out of final grade
Lecture	<p><b>A. Knowledge for mark 5:</b> - Obtain at least half of the total score on the grid test.</p> <p><b>B. Additional knowledge for mark 10:</b> - Obtaining a maximum score on the grid test.</p> <p>Note: The final mark may be increased by a maximum of 1 point if the student has been noted by the teacher for particularly active participation in the lectures, as evidenced by multiple correct answers to the teacher's questions or ingenious observations/comments/solutions made during the interactive lectures, thus demonstrating a thorough knowledge of microbiology and/or the ability to quickly make multidisciplinary connections or correlations between theoretical concepts and practical applications.</p>	<p style="text-align: center;"><b>Exam</b></p> <p>- Final exam in the form of a grid test with questions on: bacteriology, mycology, parasitology and virology, taught during the lectures and laboratory sessions.</p>	<b>80%</b>
Laboratory Sessions (LS)	<p><b>A. Knowledge for mark 5:</b> - Participation in all laboratory sessions, fulfilling the criteria of the minimum performance standard, taking the stage examination test (consisting of a grid test with questions from the material taught in the first 6 lectures and laboratory sessions) and obtaining at least half of the maximum score set for each of the 3 tests of the practical exam.</p> <p><b>B. Additional knowledge for mark 10</b> - Attendance of all laboratory sessions, with active participation in most sessions (correct answers to the seminar, proof of very good critical thinking and practical skills), submission of stage examination test and obtaining the maximum score set for each of the 3 tests of the practical exam.</p>	<p><b>Practical assessment</b></p> <p><b>a) Periodic evaluation</b> during the laboratory sessions:</p> <ul style="list-style-type: none"> <li>- Verification of correct performance of laboratory techniques;</li> <li>- Verification of good manual skills;</li> <li>- Verification of compliance with aseptic work rules.</li> </ul> <p><b>b) Final practical examination,</b> consisting of the following 3 eliminatory tests:</p> <ol style="list-style-type: none"> <li>1) Bacteriology and mycology test: microscopic examination of a smear stained with methylene blue, Gram or Ziehl-Neelsen and performance of a laboratory technique/reading and interpretation of an antibiogram/antigen-antibody reaction for diagnosis - with</li> </ol>	<b>20%</b>

	<p>Observation: A mark in the stage examination test higher than the traineeship mark may increase the last one by 1 point.</p>	<p>discussion.</p> <p>2) Parasitology test: morphological identification of a parasite (by microscopy in the case of protozoa or by macroscopic examination in the case of helminths) - with discussion.</p> <p>3) Virusology test: description of a method for culturing viruses/reading and interpretation of an antigen-antibody reaction used in the diagnosis of infections of viral aetiology/presentation of the laboratory diagnostic scheme in hepatitis B/HIV infection.</p> <p>Observation: The traineeship mark reflects both the results of the periodic assessment and the results of the practical exam.</p>	
<b>Minimum performance standards</b>			
<ul style="list-style-type: none"> <li>- Knowledge of the main differences between: bacteria - yeasts - protozoa - viruses.</li> <li>- Knowledge of the scientific names of the microorganisms taught in the lectures.</li> <li>- Identification of bacterial morphotypes, yeasts and protozoa by microscopy.</li> </ul>			

**Date:**  
**8.09.2023**

**Chair of Microbiology Division,**  
*Prof. Gabriela Băncescu*

**Date of the approval in**  
**Department Board:**

**Department director,**  
*Prof. Alexandru Bucur*