"Carol Davila" University of Medicine and Pharmacy Bucharest
Quality Assurance Committee

DISCIPLINE SHEET

1. Study programme

1.1.	"CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST
1.2.	FACULTY OF DENTISTRY
1.3.	DEPARTMENT: DENTAL MEDICINE III
1.4.	DISCIPLINE: EMBRYOLOGY AND MICROBIOLOGY
1.5.	STUDY DOMAIN: Health, sectoral regulated within the European Union
1.6.	STUDY LEVEL: I (Bachelor's degree) and II (Master's degree)
1.7.	STUDY PROGRAMME: DENTAL MEDICINE IN ENGLISH

2. Discipline

2.1.	Discipline name according to the study curriculum: MICROBIOLOGY				
2.2.	Discipline code: MD02F15EN				
2.3.	Discipline type: FD				
2.4.	Discipline optionality: COD				
2.5.	Lectures tenure: Senior lecturer Carmen Defta, Senior lecturer Lidia Sfetcu				
2.6.	Practical classes/ seminar tenure: Senior lecturer Carmen Defta, Senior lecturer Lidia Sfetcu, Teaching assistant Bogdan Dabu, Teaching assistant Ramona Vlad, Teaching assistant Carmen Ristea				
2.7. Year of study	II	2.8. Semester	IV	2.9. Evaluation	E

3. Estimated total time (hours/ semester of teaching and training activity /individual study)

I. University training						
3.1. Number of hours per week	5	from which:	3.2. lecture	2	3.3. practical class/ seminar	3
3.4. Total hours in the study curriculum	70	from which:	3.5. lecture	28	3.6. practical class/ seminar	42
II. Preparation/ individual study						
Time distribution						hours
Study of lecture materials, textbooks, books, study of the minimum recommended bibliography						28
Additional documentation activity in the library, on online platforms						15
Specific preparation activities for projects, practical classes, preparation of assignments, reports						15
Preparation for presentations or evaluations, preparation for the final examination						15
Tutoring activity						-
Other activities						7
3.7. Total hours of individual study						80
3.8. Total hours per semester (3.4.+3.7.)						150
3.9. Number of credits						5

4. Prerequisites

4.1. curriculum	General knowledge of immunology
4.2. proficiencies	Not required

5. Conditions

5.1. for lecture activity	Amphitheatre with 120 seats, desk, 2 chairs, blackboard, video projector, laptop, projection screen.
5.2. for practical class/ seminar activity	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. 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. Laboratory glassware, bacteriological loops, culture media, cedar oil, smear stain solutions, other reagents and biological products needed for laboratory work. Disinfectant and antiseptic solutions and protective equipment: working gowns, oro-nasal masks and protective gloves.

6. Learning outcomes

Knowledge	Skills	Responsibility and autonomy
- 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.	- Decontamination of surfaces/objects and antisepsis of the tegument and oral mucosa.	- Rigorous adherence to sterilization and infection control protocols.
- Understand the relationship between microorganisms and host anti-infective defence.	- Ability to collect relevant clinical samples from oral and maxillofacial infections.	- Understand the importance of collaboration between dentists - doctors of different specialties and health authorities, through information actions, exchange of ideas, transfer of knowledge, etc., regarding the diagnosis, treatment and prophylaxis of oral and extraoral infections.
- Learning the basic concepts related to the appropriate use of the antibiotics and be aware of the risk of their misuse.	- Performing smears/native preparations from clinical specimens collected from the oral and maxillofacial	- Optimal communication with patients on infectious pathology problems, adapting academic language to their level of understanding.

	region and examining them under a microscope.	
- 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.	- Interpretation of the results of microbiological tests (including antibiotic susceptibility testing of bacterial strains) and serological tests.	- Manifesting a critical spirit and scientific curiosity, by formulating pertinent questions and actively seeking answers.

7. Discipline objectives (correlated with learning outcomes)

7.1. General objective	- To provide in-depth knowledge of oral microbiology and basic general microbiology necessary for the training of future dentists.
7.2. Specific objectives	- Providing knowledge on the general characteristics of: bacteria, fungi, parasites and viruses involved in human diseases, especially in oral infections. - Explaining the importance of oral microbiota in health and disease. - Providing basic knowledge on microbiological diagnosis, prophylaxis and treatment of different infections, especially of oral infections. - Providing knowledge about biological products used in the diagnosis, prophylaxis and therapy of infectious diseases. - Providing awareness about bacterial resistance to antibiotics. - Awareness of dental students about the risk of cross-infection in dental practice and the importance of applying standard precautions to prevent infections.

8. Contents

8.1. Lecture	**Teaching methods**	**Observations**
1. Introduction to microbiology. Classification of microorganisms. Essentials of microbial taxonomy.	Interactive teaching with PowerPoint presentation.	2 hours
2. Bacterial structure and morphology.		2 hours
3. Basic bacterial physiology and genetics.		2 hours
4. Relationships bacteria - human host. Bacterial pathogenicity and basic of host anti-infective defence.		2 hours
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. Antibiotic prophylaxis in dental practice.		2 hours
6. General characteristics of the oral ecosystem. Microbiota of the oral cavity. Dental plaque: structure and stages of formation. Effects of oral biofilms.		2 hours
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 hours
8. Gram-positive cocci species of medical importance: general characteristics and infections produced. Oral streptococci - aspects of involvement in pathology.		2 hours

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. *T. pallidum* - general characteristics and infection produced.		2 hours
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 hours
11. Spore-forming and non-spore-forming Gram-positive bacilli, acid-fast bacilli and actinomycetes: general characteristics and involvement in human pathology.		2 hours
12. Fungi found in the oral cavity. *Candida albicans* - general characteristics and implications in oral pathology. Protozoa with oral habitat: *Entamoeba gingivalis* and *Trichomonas tenax* - general characteristics and implications in oral pathology. Other examples of parasites and their implications in human pathology.		2 hours
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 hours
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.		2 hours

Recent bibliography:

1. Băncescu G. Microbiology - lecture for students of the Faculty of Dentistry, UMFCD [booklet/electronic version]. Bucharest, 2023.
2. Hewlett MJ, Camerini D, Bloom DC. Basic virology, ed. 4. Hoboken: Wiley-Blackwell, 2021.
3. Leventhal R, Cheadle RF. Medical parasitology: a self-instructional text, ed. 7. Philadelphia: F. A. Davis Company, 2020.
4. Marsh PD, Lewis MAO, Rogers H, Williams DW, Wilson M. Marsh and Martin's Ora1 microbiology, ed. 6. Edinburgh: Elsevier, 2016.

8.2. Practical classes/ seminar	**Teaching methods**	**Observations**
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.	- Interactive teaching with PowerPoint/video film presentation; - Teacher's laboratory demonstration.	3 hours
2. Disinfection and antisepsis - definition, examples of disinfectants and antiseptics. Sterilisation: definition, methods, indications and sterilisation control.		3 hours

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 hours
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 hours
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 hours
6. Microbial identification techniques. Antibiogram: definition, methods, reading and interpretation. Antibioprofilaxia în stomatologie: indicații practice și exemple clinice.		3 hours
7. Antigen-antibody reactions for diagnosis: classification and principle. Examples of antigen-antibody reactions used in the diagnosis of infectious diseases - reading and interpretation. Vaccines, serums, and immunoglobulins – principles of immunoprophylaxis in medical and dental practice.		3 hours
8. Basics of laboratory diagnosis of *S. aureus* and *S. pyogenes* infections. Basics of identification of oral streptococcal species.		3 hours
9. Basics of identification of *N. meningitidis* and *N. gonorrhoeae*. Basics of laboratory diagnosis of syphilis. Porphyromonas, Prevotella, Fusobacterium și Tannerella – oral anaerobes in dental practice.		3 hours
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. *Aggregatibacter actinomycetemcomitans*).		3 hours
11. Basics of identification of *M. tuberculosis*, *C. diphtheriae, B. anthracis* and some species of clostridia with a role in human pathology. Basics of laboratory diagnosis in cervicofacial actinomycosis.		3 hours
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. *Taenia* spp., *A. lumbricoides*, *E. vermicularis*).		3 hours
13. Rules for the collection and transport of clinical samples for laboratory diagnosis of viral diseases.		3 hours

Methods of virus culture. Methods of virological and serological diagnosis. Basics of laboratory diagnostic in hepatitis B and HIV infection.		
14. Review/reworking of laboratory sessions/practical exam.		3 hours

Recent bibliography:

1. Green LH, Goldman E. Practical handbook of microbiology, ed. 4. Boca Raton: CRC Press, 2021.
2. 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.
3. Samaranayake L. Essential microbiology for dentistry, ed. 5. Edinburgh: Elsevier, 2018.
4. Zhou X, Li Y. Atlas of oral microbiology: from healthy microflora to disease, ed. 2. Singapore: Springer, 2020.

9. Assessment

Activity type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Percentage of final grade
9.4. Lecture	**A. Knowledge for mark 5:** - Obtain at least half of the total score on the grid test. **B. Additional knowledge for mark 10:** - Obtaining a maximum score on the grid test. 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.	**Exam** - Final exam in the form of a grid test with questions on: bacteriology, mycology, parasitology and virology, taught during the lectures and laboratory sessions. - The multiple-choice test will consist of 45 questions, single-choice format, of which 20 will be simple answers, and 25 will be grouped answers.	**80%**
9.5. Practical classes/ seminar	**A. Knowledge for mark 5:** - 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.	**Practical assessment** **a) Periodic evaluation** during the laboratory sessions: - Verification of correct performance of laboratory techniques; - Verification of good manual skills; - Verification of compliance with aseptic work rules.	**20%**

	B. Additional knowledge for mark 10: - 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. Observation: A mark in the stage examination test higher than the traineeship mark may increase the last one by 1 point.	**b) Final practical examination**, consisting of the following 3 eliminatory tests: 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 discussion. 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. 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. Observation: The traineeship mark reflects both the results of the periodic assessment and the results of the practical exam.	
Minimum performance standard			
● Knowledge of the main differences between: bacteria - yeasts - protozoa - viruses. ● Knowledge of the scientific names of the microorganisms taught in the lectures. ● Identification of bacterial morphotypes, yeasts and protozoa by microscopy.			