Universitat Autònoma de Barcelona

2023/2024

Clinical Microbiology

Code: 101006
ECTS Credits: 6

Degree	Type	Year	Semester
2500502 Microbiology	OB	3	1

Contact

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Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Teachers

Irene Latorre Rueda

Prerequisites

Although there is no official prerequisite, students are advised to review the concepts that refer to the microbial world, studied previously.

Objectives and Contextualisation

In this subject it is intended that the student:

- Know the most important groups of pathogenic microorganisms for humans.

- Know the basics of the microbiological diagnosis of a human infectious disease.

- Know how to evaluate the results of an antibiogram.

- Understand the relationships that are established between a pathogen and the human body.

- Know the great syndromes of human infectious disease.

- Know how to extract and correctly information regarding clinical microbiology and infectious diseases in humans from specialized sources.

Competences

- Apply microorganisms or their components to the development of products of interest in health, industry and technology.
- Apply suitable methodologies to isolate, analyse, observe, cultivate, identify and conserve microorganisms.
- Characterise the causal agents of microbial diseases in humans, animals and plants in order to diagnose and control them, perform epidemiological studies and be aware of present-day problems with these diseases and strategies to combat them.
- Obtain, select and manage information.
- Use bibliography or internet tools, specific to microbiology or other related disciplines, both in English and in the first language.
- Work individually or in groups, in multidisciplinary teams and in an international context.

Learning Outcomes

1. Describe the concepts of drug, pharmacology and pharmacokinetics.
2. Describe the techniques to determine the sensitivity of pathogenic microorganisms to antimicrobial agents.
3. Distinguish between the normal and the pathogenic microbiota.
4. Identify the drug groups used in the control of infectious diseases and relate them to their action mechanisms.
5. Identify the techniques used in the isolation, culturing and identification pathogenic microorganisms.
6. Know and define the major syndromes in infectious pathology.
7. Know the most important groups of pathogenic microorganisms.
8. Know the usefulness of molecular techniques in the diagnosis of infectious diseases and in epidemiological studies.
9. Obtain, select and manage information.
10. Understand the microbiological bases that are used to develop products of interest in healthcare.
11. Understand the relationships between a possible pathogen and its host
12. Use bibliography or internet tools, specific to microbiology or other related disciplines, both in English and in the first language.
13. Work individually or in groups, in multidisciplinary teams and in an international context.

Content

CONTENTS THEORETICAL CLASSES

Topic 1. General concepts.

Introduction. Areas of study of clinical microbiology. Groups of pathogenic microorganisms for humans. Host-parasitic relationships. Basic concepts about infectious diseases.

Topic 2. The laboratory of clinical microbiology.

Introduction. Objectives of the clinical microbiology laboratory. Diagnosis and sample pressure. Types of samples, collection and storage.

Topic 3. Urinary tract infections.

Introduction. Structure and function of the urinary tract. Factors that predispose the infection. Clinical manifestations. More frequent aetiological agents of uncomplicated cystitis: *Escherichia coli* and other gram-negative bacilli, *Staphylococcus saprophyticus* and other gram-positive bacteria. Laboratory Diagnostics. General rules for the treatment of urinary tract infections.

Topic 4. Infections of the genital system.

Introduction. Sexually transmitted diseases. Structure and function of the genital system. Factors that predispose to the infection. Clinical manifestations. Etiologic agents. *Neisseria gonorrhoeae* and *Chlamydia trachomatis*: urethritis and cervicitis. *Candida albicans* and *Trichomonas vaginalis*: vulvovaginitis. Genital ulcers: *Treponema pallidum* and herpes simplex virus. *Papillomavirus*: genital warts and cancer. Laboratory Diagnostics. Treatment and prevention. Post-part endometritis: *Streptocccus agalactiae*.

Topic 5. Respiratory infections.

Introduction. Structure and function of the respiratory system. Factors that predisposeto the infection. Clinical manifestations. *Rhinovirus*: common cold. *Streptococcus pyogenes*: Pharyngotonsillitis. *Corynebacterium diphteriae*: diphtheria. Respiratory viruses and acute bronchitis. *Bordetella pertussis*. Pneumonia, etiologic agents. *Streptococcus pneumoniae, Legionella pneumophila*. Tuberculosis: *Mycobacterium tuberculosis*. Laboratory diagnosis of respiratory infections. Treatment and prevention.

Topic 6. Oral and sinus infections.

The ear, structure and function. Factors that predispose to the infection. Clinical manifestations. Etiologic agents. External otitis: *Pseudomonas, Aspergillus* and *Candida*.Aagents of acute and chronic otitis media. Laboratory diagnostic. Treatment and prevention. Structure and function of the paranasal sinuses. Factors that predispose to the infection. Clinical manifestations. Most frequent etiological agents of sinusitis. Laboratory diagnostic. Treatment and prevention.

Topic 7. Eye infections.

The eye, structure and function. Clinical manifestations. Etiologic agents. *Chlamydia trachomatis*: the trachoma. *Neisseria gonorrhoeae*: purulent acute conjunctivitis. Viral infections.Infection of the ocular annexes. Laboratory diagnosis. Treatment and prevention.

Topic 8. Infections of the digestive tract.

Infection of the oral cavity. The mouth and teeth, structure and function. Factors that predispose to the infection. Clinical manifestations. Etiologic agents. *Streptococcus mutans*: dental caries. *Porphyromonas gingivalis*: periodontal disease. Structure and function of the gastrointestinal tract. Factors that predispose to the infection. Clinical manifestations Chronic gastritis and peptic ulcer: *Helicobacter pylori*. Intestinal infection Etiological agents of infectious gastroenteritis. Intestinal Helmintiasis. Toxicoinfection of food. Etiologic diagnosis. Treatment and prevention. Liver infection. Clinical manifestations. Etiologic agents. Laboratory diagnosis. Treatment and prevention.

Topic 9. Infections of the nervous system.

The nervous system, structure and function. Factors that predispose to the infection. Clinical manifestations. Etiologic agents of meningitis and encephalitis: *Neisseria meningitidis, Listeria monocytogenes*, enterovirus. Prions encephalopathies. Laboratory diagnosis. Treatment and prevention.

Topic 10. Infections of the skin and subcutaneous tissue.

Introduction. Skin and subcutaneous tissue, structure and function. Factors that predispose to the infection. Clinical manifestations Etiologic agents that cause skin and subcutaneous infections. Laboratory diagnosis. Treatment and prevention.

Topic 11. Infections of the circulatory system
Bacteremia, fungemia, viremia and parasitemia. Primary bacteremia. Secondary bacteremia. Sepsis and septic shock. Hemoculture. Causal agents of bacteremia. *Brucella, Francisella tulariensis* and *Yersinia pestis.*

CONTENT SEMINARS

Preparation and presentation by students of subjets related to theory classes.

Methodology

Theoretical classes. The student must acquire the scientific-technical knowledge of this subject attending these classes and complementing them with the personal study of the topics explained. The teaching of each subject will be based on a theoretical exposition and in a brief discussion of the same.

Seminars. In the seminars, students will develop topical issues in the world of clinical microbiology and infectious diseases working in cooperative or collaborative groups. They will have access to specialized scientific sources from which they will carry out an oral presentation of the selected topics.

Tutorials. Students can take individual tutorials with the teacher of the subject, whenever they need it, requesting a prior appointment.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Seminars	10	0.4	9, 13, 12
Theoretical classes	35	1.4	10, 11, 7, 6, 8, 1, 2, 3, 4
Type: Supervised			
Individual tutorials	4	0.16	
Type: Autonomous			
Preparation of seminars	23	0.92	9, 13, 12
Study	60	2.4	9, 13, 12
self-learning	14	0.56	9, 12

Assessment

EVALUATION ACTIVITIES PROGRAMMING

1) Theoretical classes. The evaluation of the theoretical contents of the subject corresponding to the knowledge acquired in the theoretical classes, will be carried out by means of the accomplishment of two written tests (60% of global note). To pass this part of the subject, the notes obtained in each written tests must be equal to or greater than 5 points.

2) Oral presentation seminars. The oral presentation (20% of global note) of a topic in the field of clinical microbiology and infectious diseases will be evaluated. This activity is mandatory.

3) Assistance to seminars and active participation. Attendance at the seminars and the performance of exams related to all the exhibitions will represent a 20% of global note.

To pass the seminars, a score equal to or greater than 5 points must be obtained.

To pass the subject, a minimum score of 5 points must be obtained in the evaluation of the theoretical contents and a minimum score of 5 points in the part of seminars. Students who fail the minimum qualification of the theoretical part will be able to do a recovery exam that will have a maximum score of 5 points. Students who do not achieve the minimum qualification of the seminars should do a recovery that will consist of an oral presentation of a scientific article and a written exam that will contain questions about all the seminars made by their peers and who will have a note maximum of 5 points.

To participate in the recovery, the students must have previously been evaluated in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subjector module. Therefore, students will obtain the "Non-Valuable" qualification when the evaluation activitiescarried out have a weighting of less than 67% in the final grade.

Single assessment

The students who choose the single assessment must do the seminars in face-to-face sessions since they are mandatory teaching activities. The evaluation will be the same as for the continuous assessment.

The single assessment consists of a final exam that will contain questions on the whole theoretical content of the subject. This final assessment will correspond to the 60% of the final score of the subject. This single assessment test will be held coinciding with the same date for the last continuous assessment test. The same criterion will be applied to pass the subject as for the continuous assessment: the mark should be equal or higher than a 5. The same retake system as for the continuous assessment will be applied. The revision of the final qualification will follow the same procedure as for the continuous assessment.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance at seminars and active participation	20%	0	0	9, 13, 12
Seminars, oral presentation	20%	0	0	9, 13, 12
Theoretical classes, written exam	30%	2	0.08	10, 8, 1, 2, 4, 5
Theoretical classes, written exam	30%	2	0.08	11, 7, 6, 3

Bibliography

Online / print books

- Prats, Guillem, et al. Microbiología y parasitología médicas / director: Guillem Prats; coordinador general: Tomàs Pumarola; coordinadora científico-técnica: Beatriz Mirelis. 2.a edición, Editorial Médica Panamericana, 2023.

- Murray, Patrick R., et al. Medical Microbiology / Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller. Ninth edition, Elsevier, 2021.

- Bennet, John E. et al. Mandell, Douglas, Bennett. Enfermedades infecciosas. Principios y práctica John E. Bennet, Raphael Dollin, Martin J. Blaser; colaboradores. 9a ed. Barcelona: Elsevier España, 2021. Print.

Websites

Sociedad Española de Enfermedades Infecciosas y Microbiología Clínica. Documentos Científicos. http://www.seimc.org

European Center for Disease, Prevention and Control http://ecdc.europa.eu/en/Pages/home.aspx

European Food Safety Agency EFSA. http://www.efsa.europa.eu/

Centers for DiseaseControl and Prevention, USA. http://www.cdc.gov/

Organització Mundial de la Salut. http://www.who.int/en/

Instituto de Salud Carlos III Centro Nacional de Epidemiología. http://www.isciii.es/

Generalitat de Catalunya Salut. http://www.gencat.cat

Agència de Salut Pública de Barcelona. http://www.aspb.cat/

Software

None