

Degree	Type	Year
2500502 Microbiology	OB	3

Contact

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Teachers

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Teaching groups languages

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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, students are expected to:

- Recognize the most important groups of pathogenic microorganisms for humans.
- Identify the bases of the microbiological diagnosis of a human infectious disease.
- Interpret the results of an antibiogram.
- Recognize the relationships that are established between a pathogen and the human body.
- List the major syndromes of human infectious pathology.
- Describe and correctly report information regarding clinical microbiology and infectious diseases in humans from specialized sources.

Learning Outcomes

1. CM13 (Competence) Plan diagnostic and control strategies for infectious diseases from a global perspective and integrating clinical and epidemiological data to provide innovative responses to the challenges, needs and demands of society.
2. CM14 (Competence) Integrate knowledge and skills in the field of microbiology applied to health, working individually and in groups, to prepare and present in writing or orally and publicly a scientific work either in English or in one's own language or others.
3. KM19 (Knowledge) Identify the cellular and molecular relationships established between a microorganism or parasite and its host, including physiological and pathological mechanisms of defence and host response.
4. KM20 (Knowledge) Describe the most important groups of infectious agents, their biological cycles, the molecular mechanisms of pathogenesis and toxicity and the epidemiology of the diseases they cause.
5. KM21 (Knowledge) Indicate the main prevention and control measures.
6. SM19 (Skill) Use bibliography or internet tools, both in English and in one's own language or others, for the study of pathogenic microorganisms and their control.
7. SM20 (Skill) Apply appropriate methods for the identification, diagnosis and control of microbial agents and their genetic or metabolic components in clinical samples or food.
8. SM21 (Skill) Relate the characteristics of pathogens and their mechanisms of virulence and pathogenicity with the type of infection, the pathology and the immune response that develops and with the mechanisms of action of vaccines and antimicrobial agents.

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: *Streptococcus agalactiae*.

Topic 5. Respiratory infections.

Introduction. Structure and function of the respiratory system. Factors that predispose to the infection. Clinical manifestations. *Rhinovirus*: common cold. *Streptococcus pyogenes*: Pharyngotonsillitis. *Corynebacterium diphtheriae*: 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*. Agents 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 Helminthiasis. 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 tularensis* and *Yersinia pestis*.

CONTENT SEMINARS

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

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Seminars	10	0.4	CM14, SM19, CM14

Theoretical classes	35	1.4	CM13, KM19, KM20, KM21, SM20, SM21, CM13
Type: Supervised			
Individual tutorials	4	0.16	CM13, KM19, KM20, KM21, SM20, SM21, CM13
Type: Autonomous			
Preparation of seminars	23	0.92	CM14, SM19, CM14
Study	60	2.4	CM13, KM19, KM20, KM21, SM19, SM20, SM21, CM13
self-learning	14	0.56	CM13, CM14, KM19, KM20, KM21, SM19, SM20, SM21, CM13

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.

Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance at seminars and active participation	20%	0	0	CM14
Seminars, oral presentation	20%	0	0	CM13, CM14, KM19, KM20, KM21, SM19, SM20, SM21
Theoretical classes, written exam	30%	2	0.08	CM13, KM19, KM20, KM21, SM20, SM21
Theoretical classes, written exam	30%	2	0.08	CM13, KM19, KM20, KM21, SM20, SM21

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 subject module. Therefore, students will obtain the "Non-Valuable" qualification when the evaluation activities carried 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.

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

Language list

Name	Group	Language	Semester	Turn
(SEM) Seminars	731	Catalan	first semester	morning-mixed
(SEM) Seminars	732	Catalan	first semester	morning-mixed
(TE) Theory	73	Catalan	first semester	morning-mixed