

Degree programme	Type	Course
Medicine	OB	3

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Group languages

You can consult this information at the [end](#) of the document.

Prerequisites

General knowledge of cellular and molecular biology, anatomy, physiology and microscopic structure of human organs and systems.

Objectives

Medical Microbiology and Parasitology is placed in the Third Course in Medicine Degree, together with other subjects, which place the student in the world of functional and structural human diseases.

The fact that a set of diseases are caused by microorganisms, presupposes a specific area of interrelation between two living beings, whose relationship, in certain circumstances, result in pathological processes that translate into infectious disease.

The subject is inserted in a year (third) in which General Pathology (pathophysiology), Pathological Anatomy and Pharmacology are developed. An intense correlation is developed with these areas of knowledge, both with the conceptual and the organizational sphere.

Infectious diseases respond to the action of a living causative agent, a specific and differential aspect with the rest of pathology and that entails several particularities such as the mentioned biological interaction between living beings and the transmission of microorganisms between people and therefore of the disease.

At the same time, these diseases are subject to treatment by means of antimicrobial medications, and immune prophylaxis through vaccines.

To identify the causative microorganism of the disease, cardinal aspect to establish the treatment and the prophylaxis, the location of the infections (focal and general) must be specified to take the appropriate samples to refer them to the laboratory of microbiology, where the studies are done to determine the etiological diagnosis. This aspect is important so that the treatment is directed and effective.

So, in Microbiology, we can differentiate knowledge objects and applied objectives: 1) microorganisms as causative agents of disease, 2) injury caused by the microorganisms defined by their pathogenicity and virulence 3) the host responses 4) the diagnostic processes and 5) the treatment and prophylaxis.

The processes of microbial injury and host response are inseparable and conform what we can define as the pathophysiology of infection.

In this context the training objectives include:

- 1- List the microorganisms that cause human illness (pathogenic microorganisms) and differentiate them from the commensal microorganisms.
- 2- Describe the biological characteristics of microorganisms, emphasizing the following aspects: morphology, physiology and life cycles.
- 3- Name and describe the reservoirs of microorganisms and ways of transmission.
- 4- Describe the virulence factors and the mechanisms that explain the pathogenic capacity.
- 5- Describe the nonspecific and specific defense mechanisms of the host. Describe the interrelations between the pathogen and the host (ie the pathophysiology of the infection). Describe the concept of opportunism.
- 6- Describe the normal microbiome. Enumerate its physiological functions and its relation to opportunism.

- 7- Determine the clinical samples of the focus of infection that must be collected and establish the measures and procedures to collect them and to transfer them to the laboratory for their study.
- 8- Identify the tests that must be requested to the laboratory to make the etiological diagnosis of the process.
- 9- To know the antimicrobials and their indications.
- 10- Describe the sensitivity tests that must be used in the different microorganisms to direct the antimicrobial treatment.
- 11- Establish the rules of immediate prophylaxis (isolation and immune prophylaxis) and long-term (vaccination).
- 12- Based on the preceding information the most important microorganisms of human pathology are described to analyse and revise their characteristics: 1) structure and physiology 2) general epidemiology, reservoir and transmission mechanism 3) pathogenesis 4) clinical 5) etiologic diagnosis and 6) prophylaxis and treatment.

Learning outcomes

1. Identify the principles behind microbiology and parasitology.
2. Explain the concept and the biological types of microorganisms.
3. Identify the importance of symbiosis as a way of living. Commensalism and parasitism as forms of symbiosis.
4. Describe the main infectious syndromes caused by the various microorganisms.
5. Describe the host-parasite interrelationship: mechanisms of pathogenicity and defence.
6. Explain the basic concepts of microbial genetics and its relationship to pathogenicity and resistance to antimicrobial agents.
7. Identify the actions to prevent and protect against infectious diseases.
8. Describe the methods of microbiological diagnosis of infectious diseases comprehensively and holistically, from a theoretical and a practical perspective.
9. Identify the causal agents and the risk and diagnostic factors of infectious diseases.
10. Indicate the basic techniques and procedures for diagnosing the major syndromes of infectious pathology.
11. Indicate the clinical samples necessary for the microbiological diagnosis of syndromes, and how they are to be collected and transported to the laboratory.
12. Identify the performance of the different diagnostic techniques and interpret their results.
13. Identify the indications of microbiological tests.
14. Establish a diagnostic approach and a specific strategy for action for each of the microorganisms responsible for infectious diseases.
15. Identify, individually, the biological, epidemiological (reservoir and transmission), pathogenic, clinical, diagnostic and therapeutic features of the different microorganisms responsible for infectious diseases.
16. Identify the main mechanisms of resistance to antimicrobial agents.
17. Maintain and sharpen one's professional competence, in particular by independently learning new material and techniques and by focusing on quality.
18. Demonstrate, in professional activity, a perspective that is critical, creative and research-oriented.
19. Communicate clearly, orally and in writing, with other professionals and the media.
20. Use information and communication technologies in professional practice.

Contents

Introduction to medical microbiology. Agents causing infectious diseases. Epidemiology. Main infectious syndromes. Microbial genetics. Mechanisms of pathogenicity. Defense mechanisms. Diagnosis of infectious diseases. Normal flora Treatment of infectious diseases. Mechanisms of resistance. Techniques for the study of the sensitivity to antimicrobials.

- Bacterial structure. Antibacterial drugs. Staphylococci. Streptococci. *Neisseria meningitidis* and *Neisseria*

gonorrhoeae. Colonizing and pathogenic *Enterobacteriaceae*. Gram-negative non-fermenting bacilli. *Vibrios*. *Parvobacteria*. *Legionella*. *Mycobacteria*. Anaerobic bacteria. *Treponematoses*. *Mycoplasma Chlamydia*. *Rickettsia*.

- General characteristics of fungi. Antifungal agents. Yeasts. Molds. Dermatophytoses. Dimorphic fungi.
- General characteristics of viruses. Antiviral drugs. Enterovirus. Picornavirus and viruses that cause enteritis. Respiratory viruses Herpesvirus: herpes simplex virus, varicella, cytomegalovirus and Epstein Barr virus. Papillomavirus and Polyomavirus. Viruses causing exanthema diseases. Hepatitis virus. Viruses of human immunodeficiency. Arbovirus and emerging viruses.
- General characteristics of parasites. Anti-parasitic drugs. Protozoa of open cavities. Systemic protozoa. Helminths. Arthropods of interest in medicine.

Distributive blocks

A. Introduction to Microbiology

B. Bacteriology

C. Mycology

D. Virology

E. Parasitology

Schedule lectures

1. Introduction to Microbiology. Medical microbiology: vision as a whole

2. Pathogens causing infectious diseases. Autochthonous flora

3. Infectious diseases
4. Microbial genetics
5. Mechanisms of microbial pathogenicity
6. Host defense mechanisms
7. Epidemiology and prevention of infectious diseases
8. Classical diagnosis of infectious diseases
9. Molecular and serological diagnosis of infectious diseases
10. Structure and bacterial metabolism
11. Antibacterial drugs
12. Staphylococci
13. Streptococci
14. *Neisseria*
15. Pathogenic *Enterobacteriaceae*
16. Commensal enterobacteria and gram-negative non-fermenting bacilli
17. *Campylobacter*, *Helicobacter* and *Vibrio*
18. Parvobacteria and *Legionella*

19. Mycobacteria. *Mycobacterium tuberculosis* complex
20. Opportunistic environmental mycobacteria
21. Anaerobic bacteria
22. Spirochetes
23. *Chlamydia*
24. *Mycoplasma* and *Rickettsia*
25. Structure and metabolism of fungi
26. Antifungal agents
27. Yeasts
28. Dermatophytoses
29. Dimorphic fungi
30. Molds
31. Structure and propagation of viruses
32. Antiviral agents
33. Enterovirus. Picornavirus. Virus causing enteritis
34. Respiratory Virus: Flu. Syncytic respiratory virus. Other respiratory viruses

35. Herpes simplex virus. Chicken pox
36. Citomegalovirus. Virus Epstein- Barr. Other herpesvirus
37. Papillomavirus and Polyomavirus
38. Viruses causing exanthemic diseases
39. Hepatitis viruses (1)
40. Hepatitis viruses (2)
41. Viruses of human immunodeficiency
42. Arbovirus. Emerging viruses
43. General characteristics of protozoa and helminths
44. General characteristics of parasitic diseases. Arthropods of medical interest
45. Protozoa of open cavities
46. Systemic protozoa. Leishmania and Tripanosoma
47. Systemic protozoa. Toxoplasma and Plasmodium
48. Platelminths: Trematodes. Beasts
49. Intestinal and tissues nematodes

Laboratory practices

1. Conventional diagnosis of infectious diseases. Direct examination: Gram staining and Ziehl-Neelsen.
2. Techniques and means of cultivation. Identification
3. Study of the sensitivity to antimicrobials. Antibigram
4. Diagnosis of special bacteria: Mycobacteria and anaerobic bacteria
5. Quick diagnosis. Antigen detection
6. Molecular diagnosis of infectious diseases
7. Fungi
8. Viruses
9. Parasites
10. Serological diagnosis of infectious diseases

Specialized seminars

a) Fundamentals of practical education

1. Concept of infectious disease, focus of infection and clinical sample
2. Direct examination. Cultivation and Identification
3. Sensitivity to antimicrobials

4. Quick diagnosis. Antigen detection Techniques of molecular biology

5. Indirect etiologic diagnosis.

b) Clinical syndromes

1. Urinary infection

2. Sexually transmitted infection

3. Enteritis

4. Infection of the central nervous system

5. Respiratory infection

6. Infection of skin and soft parts

7. Osteo-articular infections

8. Hepatitis

9. Nosocomial infection

10. AIDS

Oral presentation

Presentation of work by students

Language: The language of the subject will be in Catalan. Occasionally, some teachers can give their class in Spanish.

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Classroom practical work (PAUL)	10	0.4	
Specialized seminars (SEM)	15	0.6	
Theory (TE)	50	2	
Autonomous activities: exercise writing, personal study, reading reports, reports of interest	100	4	
Clinical cases seminars (SCC)	10	0.4	
Laboratory practical work (PLAB)	5	0.2	

This Guide describes the framework, contents, methodology and general norms of the subject, in accordance with the current curriculum. The final organization of the subject with regard to the number and size of groups, distribution in the calendar and dates of examinations, specific criteria of evaluation and review of exams, will be specified in each one of the Hospital Teaching Units (UUDHH), who will explain it through their web pages and the first day of class of each subject, through the teachers responsible for the subject at the UUDHH.

For the 2019-2020 academic year, the professors designated by the Departments as responsible for the subject at the Faculty level and the UUDHH are:

Responsible department(s): Department of Genetics and Microbiology. Area of Microbiology Head of Faculty: Ferran Navarro Risueño

UUDHH Responsible

UD Vall d'Hebron: Juan Jose Gonzalez López

UD Germans Trias i Pujol: Pere-Joan Cardona Iglesias

UD Sant Pau: Ferran Navarro Risueño

UD Parc Taulí: Lorena Forqué Rodriguez

Methodology

The teaching methodology will consist of theoretical classes, laboratory work, specialized seminars and clinical cases presentation.

Theoretical classes will be taught in the form of master classes and constitute a basic knowledge base on which all the rest of the learning activity is supported.

The seminars will be held in groups of 20 students. In these seminars, the basic principles of the etiologic diagnosis of infectious diseases will be reviewed and discussed with students. These seminars are the theoretical basis for the correct realization of the laboratory work.

The laboratory work will be carried out in groups of 5-6 students. In these practices the students will develop different techniques to familiarize themselves with the methods of work of the Microbiology laboratory used for the etiologic diagnosis of infectious diseases.

Classroom practices are based on the development of a clinical case on the part of the students, previous orientation on the part of the teachers about the content of the subject proposed, the way to develop it, as well as the objectives that have to be done. Achieve, through support tutorials. Afterwards the students will orally present in class the result of their work.

In the current exceptional circumstances, at the discretion of the teachers and also depending on the resources available and the public health situation, some of the theoretical classes, practicals and seminars organized by the Teaching Units may be taught either in person or virtually.

Face-to-face classes are considered works protected by intellectual property rights, which is why the recording of classes taught by the teaching staff by any means is not authorized, except in those cases in which the teaching staff expressly authorizes it in the corresponding session.

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	Weight	Hours	ECTS	Learning outcomes
Evaluation of the practical part	40%	4	0.16	8, 9, 10, 11, 12, 13, 14, 19
Theoretical part evaluation	60%	6	0.24	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

CONTINUOUS ASSESSMENT

The subject will be assessed through two partial exams.

CONTINUOUS ASSESSMENT

1. Evaluation of the theory (30% of the grade of each midterm)

1. Formats (one or more of the above):
2. Multiple-choice items
3. Restricted questions
4. Correspondence items

2. Evaluation of practices / seminars / classroom

1. Formats (one or more of the above):
2. Multiple-choice items
3. Restricted questions
4. Correspondence items
5. Troubleshooting
6. Oral defense of assignments

7. In the 1st part:
8. Internships → 15%
9. Evaluation of laboratory practices, right at the end of them (5%)
10. In the 2nd part:
11. Clinical case seminars + classroom practices → 20%

Requirement to partially pass and release subject matter

To release the subject of the midterm exams, a grade equal to or greater than 5 is required.

There will be a recovery assessment where the student will be examined for the parts not released in the partial exams. This recovery exam will have the same structure and relative weight of the different parts as the partial exams and will be averaged, if applicable, with the grade obtained in the freed partial. To pass the subject you will need to obtain an overall grade equal to or higher than 5 out of 10.

Attendance at classroom practices, laboratory practices, clinical case seminars and specialized seminars is mandatory and an essential condition to be evaluated.

Reviewing tests is considered a fundamental part of learning. With their exam in front of them, students will hear what teachers expect from the various assessment activities. The day and time of the exam review will be announced together with the grades both on the Virtual Campus and on the notice board.

Students who do not take both the theoretical and practical assessment tests will be considered Not Assessed and will be recorded as such in the minutes, exhausting their rights to register for the subject.

Any irregularity in an assessment act (academic fraud, plagiarism or improper use of AI, unless this use is expressly authorized in the teaching guide), which may lead to a significant variation in the grade, means that this act will be graded with a 0. In the event that the teaching guide provides that in order to pass the subject it is an essential requirement to have obtained a minimum grade in this assessment act or that several irregularities occur in the assessment acts of the same subject, the final grade for this subject is 0. Apart from this, a disciplinary process may be initiated against the student who incurs any of these irregularities.

SINGLE ASSESSMENT

This subject is not subjected to a single assessment

Use of AI

In this subject, the use of Artificial Intelligence (AI) technologies is allowed as an integral part of the development of the work, provided that the final result reflects a significant contribution of the student in the analysis and personal reflection. The student will have to clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how they have influenced the process and the final result of the activity. Lack of transparency in the use of AI will be considered a lack of academic honesty and may lead to a penalty in the grade of the activity, or greater penalties in cases of seriousness.

Bibliography

Bibliografía específica

- Prats G. Microbiología i Parasitologia mèdiques. Madrid. Editorial Panamericana. 2023
- Murray PR., Rossental KS., Pfaller MA. Medical Microbiology. 9th Ed. Philadelphia. Elsevier. 2020.

- Brooks GF, Carroll KC, Butel JS, Morse SA. Medical Microbiology. 24 Ed. New York: McGraw Hill. 2007

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- Mandell GL., Bennet JE., Dolin R. Mandell, Douglas and Bennet's - Principles and Practice of Infectious Diseases. 9th Ed. Philadelphia: Elsevier Churchill Livingstone, 2020.

- Ausina V., Moreno Guillén S. Tratado SEIMC de Enfermedades Infecciosas y Microbiología Clínica. Madrid. Editorial Médica Panamericana. 2006. Farreras-Rozman. Medicina Interna. 16th Ed. Elsevier España, S.L. 2009

Enllaços web d'interès

- www.seimc.org
- www.escmid.org
- www.scmimc.org
- www.asm.org
- www.cdc.gov
- <http://www.microbelibrary.org>. Pàgina oficial de la Societat Americana de Microbiologia (ASM). Conté una gran varietat d'imatges i vídeos sobre el contingut de la matèria.
- <http://www.biofarma.net> Clicar "Les cahiers". Llibres molt didàctics en francès i amb imatges molt adequades de les parts principals de la matèria
- <http://www.seimc.org>. Pàgina oficial de la Societat Espanyola de Malalties Infeccioses i Microbiologia Clínica.
- <http://www.microbisome.com>. Conté imatges de microbiologia y malalties infeccioses.
- <http://www.microbiologyinpictures.com>. Conté imatges de cada microorganisme patògen important

Software

No specific software required

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE