CU Medical Virology

CU characterization:

CU name:
Medical Virology

Scientific area acronym:
VM

Duration:
Modular

Working hours:
196

Contact hours:
52,5: T (34); TP (2); PL (8); S (4); OT (2); O (2,5)

ECTS:
7

Observations:
Not applicable

Teacher in charge and respective teaching load in the CU:
Dr. João Piedade – 29 contact hours (teaching load: 0,97)

Other teachers and respective teaching load in the CU:
Dr. Ricardo Parreira – 22,5 contact hours (teaching load: 0,75)
Dr. Paulo Paixão (NMS/FCM) – 17 contact hours (teaching load: 0,57)
Dr. Maria de Jesus Chasqueira (NMS/FCM) – 3 contact hours (teaching load: 0,1)

Intended learning outcomes (knowledge, skills and competences to be developed by the students):
At the end of this course, students should be able to:
1. Recognize the differences between viruses and biological species;
2. Describe the high diversity of viruses and understand the basis of the taxonomic classification of viruses;
3. Understand the mechanisms of viral transmission and infection;
4. Describe the general principles of different molecular strategies of viral replication;

5. Understand the molecular interactions of viruses (from different families) with animal cells, and apply basic concepts of cellular and molecular biology to describe the replication cycles of representative viruses with high impact on human health;
6. Recognize the importance of studying viruses and the high burden of viral diseases in human society;
7. Describe and understand the epidemiology, pathophysiology, clinics, diagnostics, prevention methods, and treatment available for selected groups of viruses/viral infections (e.g. retroviruses, arboviruses, papillomaviruses, herpesviruses, respiratory viruses, hepatitis viruses, and vertically transmitted viruses).

Syllabus:

1. Milestones in Virology. General properties, structure, classification, and nomenclature of viruses;
2. Replication strategies of DNA viruses;
3. Replication strategies of RNA viruses (with positive, negative, or ambisense single-stranded, and double-stranded genomes):
4. Replication strategies of viruses with reverse transcriptase: the particular case of the *Retroviridae* family;
5. Epidemiology of influenza virus infection;
6. Epidemiology of infections by arboviruses;
7. Molecular diagnostics of hepatitis C virus (HCV) infection;
8. Laboratory diagnostics of human immunodeficiency virus (HIV) infection;
9. Viral hepatitis infections;
10. Papillomavirus infections;
11. Viral infections of the respiratory tract;
12. Herpesvirus infections;
13. Viral infections with elimination programs (rubella, measles, poliomyelitis);
14. Vertically-transmitted viral infections (CMV, parvovirus B19, HIV);
15. Seminar on selected “hot topics” in Medical Virology (to be prepared by students).

Evidence of the syllabus coherence with the CU intended learning outcomes:

The selected contents are organized into two distinct, but complementary, areas as part of Medical Virology. The first part corresponds to specific content relating to fundamental concepts in Virology (e.g. strategies used by viruses to replicate into host cells). The apprehension of these contents will provide students with the founder concepts for a better understanding of specific phenomena, with medical and epidemiological expression, resulting from the interaction between viruses and their hosts, whether at the cellular or the organism level. In the second part, the selected syllabus seeks to drive the teaching and learning process to a broader scale, aiming at understanding viruses as part of their particular "ecological niches", with a special focus on selected examples of viruses with interest in human health. This organization will allow master students to fulfill the learning objectives of this curricular unit in two distinct but complementary and sequential steps.

Teaching methodologies (including assessment):

Contact hours will be distributed through lectures, laboratory practices, and tutored discussion sessions on specific topics selected from a list provided at the beginning of the curricular unit, with an end to its oral presentation, as a seminar (this activity involves the semi-autonomous

search and selection of relevant bibliography). Other activities may also be suggested, such as visits to virology laboratories, assistance to conferences, etc. The final assessment will comprise two components: a final exam with multiple-choice questions (with a number of questions per topic proportional to its teaching time coverage during the course), and the preparation of an oral presentation on a selected "hot topic" in this area of knowledge (the assessment criteria will be previously announced, e.g., organization of the text produced, scientific accuracy, demonstration of an up-to-date knowledge on the selected topic).

Evidence of the teaching methodologies coherence with the CU intended learning outcomes:

The teaching methodologies proposed, resulting in a mix between a more formal teaching/learning process based on traditional, but broadly participated, lectures, and an individual process, focused on the semiautonomous work of the master students, aiming to stimulate the acquisition of an increasing degree of independence, responsibility and scientific autonomy, seem appropriate to the achievement of all the predefined learning objectives. It is intended that the students acquire a set of general and specific skills that enable a comprehensive and multidisciplinary approach to specific problems in this field of knowledge (Medical Virology). The two assessment components planned for this course also reflect its organization in the previously described components, demonstrating the teaching methodologies' dual nature and consistency with the learning objectives previously put forward.

References for consultation / mandatory existence:

(A) Medical Virology

- Barroso H, Meliço-Silvestre A, Taveira N (coords.) (2014). *Microbiologia Médica*, vol. 2 (Virologia). Lidel, Lisbon.
- Oxford J, Kellam P, Collier L (2016). *Human Virology*. Oxford University Press, Oxford, 5th Ed.

(B) General and Molecular Virology

- Dimmock NJ, Easton AJ, Leppard KN (2016). *Introduction to Modern Virology*. Wiley-Blackwell, Oxford, 7th Ed.
- Flint J, Racaniello VR, Rall GF, Hatziioannou T, Skalka AM (2020). *Principles of Virology*. ASM Press, Washington, DC, 5th Ed. (2 vols.).
- Hewlett MJ, Camerini D, Bloom DC (2021). *Basic Virology*. Wiley-Blackwell, Hoboken, NJ, 4th Ed.
- Rybicki EP (2023). *Cann's Principles of Molecular Virology*. Elsevier Academic Press, London, 7th Ed.

APPENDIX

Syllabus organization and schedule:

DATES	TIMES	CONTENTS	TEACHER
21/11/2024	16:00 – 20:00	Apresentação da UC – regras de funcionamento. Introdução à Virologia. Estrutura, classificação e nomenclatura dos vírus.	Dr. João Piedade
25/11/2024	16:00 – 18:00	Estratégias replicativas dos vírus com genoma de DNA.	Dr. Ricardo Parreira
	18:00 – 20:00	Estratégias replicativas dos vírus com genoma de RNA (cadeia simples com polaridade negativa). – 1.ª parte	Dr. João Piedade
26/11/2024	16:00 – 18:00	Estratégias replicativas dos vírus com genoma de RNA (cadeia simples com polaridade negativa). – 2.ª parte	Dr. João Piedade
	18:00 – 20:00	Estratégias replicativas dos vírus com genoma de RNA (cadeia simples com polaridade positiva e cadeia dupla).	Dr. Ricardo Parreira
27/11/2024	16:00 – 20:00	**Aula prática:** Diagnóstico molecular da infeção pelo vírus da hepatite C.	Dr. Ricardo Parreira Dr. João Piedade
28/11/2024	16:00 – 18:00	Família *Retroviridae*. Vírus da imunodeficiência humana (parte I).	Dr. Ricardo Parreira
	18:00 – 20:00	Vírus da imunodeficiência humana (parte II).	Dr. João Piedade
02/12/2024	16:00 – 20:00	**Aula prática:** Diagnóstico laboratorial da infeção pelo vírus da imunodeficiência humana.	Dr. João Piedade Dr. Ricardo Parreira
03/12/2024	16:00 – 18:00	Epidemiologia da infeção pelo vírus da gripe.	Dr. João Piedade
	18:00 – 20:00	Epidemiologia das arboviroses.	Dr. Ricardo Parreira
04/12/2024	16:00 – 19:00	Hepatites virais.	Dr. M.ª de Jesus Chasqueira
	19:00 – 20:00	Papilomavírus.	Dr. Paulo Paixão
05/12/2024	16:00 – 20:00	Infeções virais respiratórias.	Dr. Paulo Paixão
09/12/2024	16:00 – 20:00	Família *Herpesviridae*: vírus do herpes humano 1 e 2, citomegálico humano, de Epstein-Barr, varicela-zoster e do herpes humano 6, 7 e 8.	Dr. Paulo Paixão
10/12/2024	16:00 – 18:00	Infeções virais com programas de eliminação: rubéola, sarampo e poliomielite.	Dr. Paulo Paixão
	18:00 – 20:00	Infeções virais com transmissão vertical: vírus citomegálico humano, parvovírus B19, vírus da imunodeficiência humana.	
11/12/2024	16:00 – 20:00	**Avaliação**: Apresentações temáticas.	Dr. João Piedade Dr. Paulo Paixão Dr. Ricardo Parreira
18/12/2024	16:00 – 18:30	**Avaliação**: Exame escrito (1.ª época).	Dr. João Piedade Dr. Ricardo Parreira
10/03/2025	16:00 – 18:30	**Avaliação**: Exame escrito (2.ª época/melhoria).	Dr. João Piedade

Teaching language:

Portuguese.

Classrooms/institution:

Instituto de Higiene e Medicina Tropical and Faculdade de Ciências Médicas, according to the specific schedule to be distributed to students in advance.

Additional information on student's assessment (assessment type, criteria, schedule):

a) Type of Assessment:

- Final written exam + Oral thematic presentation (group seminar)
- Exam – 70% (multiple-choice test with 50 questions)
- Thematic presentation – 30% (the group will receive a collective grade, but individual adjustments of up to ± 2 points may be made as a bonus or penalty).

b) Assessment Criteria:

- Minimum attendance of 2/3 of the total number of classes.
- A minimum score of 9.0 points is required in each of the two assessment components, and a weighted final average of at least 9.50 points is needed to pass.

c) Assessment Schedule:

- Group thematic presentation/seminar: December 11, 2024.
- First Exam Period: December 18, 2024.
- Second Exam Period/Resit: March 10, 2025.
- Special Exam Period: To be scheduled later, if needed.