Teaching guide

IDENTIFICATION DETAILS

Degree:	Biotechnology
Scope	Biology and Genetics
Faculty/School:	Experimental Sciences
Course:	VIROLOGY I
Type:	Compulsory
ECTS credits:	3
Year:	3
Code:	2050
Teaching period:	Sixth semester
Subject:	Molecular Biomedicine
Module:	Biochemistry and Molecular Biology
Teaching type:	Classroom-based
Language:	Spanish
Total number of student study hours:	75

SUBJECT DESCRIPTION

The overall objective of the course is to provide guidelines for the acquisition of tools for the study and understanding of the foundations in virology through the study of aspects that involve a greater relationship with biotechnology and its application in biomedical research. It focuses on modern virology as (i) an object of study in the context of life sciences, (ii) as a tool for technological development and (iii) as an element of application in future biotechnological therapies and processes.

It seeks to provide tools that allow the study and understanding of the fundamentals of Virology, both its relationship with Biotechnology and with Biomedical Sciences.
Virology is a science that studies viruses, entities without cellular organization that multiply inside metabolically active cells. It's a hugely interesting subject for biotechnology students for several reasons:

(1) viruses are responsible for multiple diseases in all types of hosts, ranging from infectious diseases to some types of cancer, (2) some viruses are used as tools in different molecular biology techniques, for the preparation of vaccines, and as vehicles in gene therapy.
Compared to the 'classic' study of Virology as a compendium of the singularities of virus families, both an overview and another are offered according to the degree of Biotechnology, this is greater knowledge from a structural, molecular and applied point of view.

GOAL

The overall objective of the course is to provide an overview of modern virology as
(i) object of study in the context of life sciences,
(ii) as a tool for technological development and
(iii) as elements of application in future therapies

The specific aims of the subject are:

Reflect on the fundamental principles that govern biological processes at the cellular and molecular levels.

Know the procedures for characterizing and quantifying animal viruses.

Recognize how organ damage is the product of virus action.

Develop a cross-sectional view of cell biology through the study of viruses and their interaction with cells.

PRIOR KNOWLEDGE

Virology, given its transversality in the contents used for its study, requires previous knowledge in cell biology, biochemistry and molecular genetics, as well as fundamentals of immunology in order to understand the subject and allow an adequate development of knowledge learning.

COURSE SYLLABUS

The syllabus is divided into FOUR major conceptual blocks:
Block 1. Basic Concepts of Virology
1.1 Definition of viruses. Origins of Virology. History and discovery of viruses. The Hershey and Chase experiment. Viral origin.
1.2 Structure and morphology of viruses. Baltimore ranking. Viral genomes. Symmetry of the capsids. Viral envelope. Viral taxonomy.
1.3 Viral growth, quantification and characterization.
Block 2. Virus-cell interaction.
2.1 Mechanisms of entry and spread of viral infection in the cell.
2.2 Viral transcript. Replication strategies used by DNA and RNA viruses.
2.3 Viral assembly and output.
Block 3. Viral pathogenesis.

3.1 Virulence Factors. Transmission routes. Infection models.
3.2 Oncogenic Viruses. Mechanisms by which they cause disease. Examples.
3.3 Human Immunodeficiency Virus. Discovery. Virion properties. Pathogenesis and epidemiology.
3.4 Emerging and reemerging viruses. Causes. Examples.
Block 4. Importance of viruses.
4.1 Plant viruses.
4.2 Applications.

EDUCATION ACTIVITIES

Participatory exhibition class. The theoretical contents of the subject will be taught in master classes presented by the teacher or by guest teachers. Student participation in the development of the class will be encouraged by proposing questions to the attendees in order to ensure a greater understanding of the concepts taught. Additionally, self-evaluation, review and reinforcement exercises will be carried out in person both individually and together in the classroom.
On the other hand, to strengthen content and promote critical thinking, students will find study material in the Virtual Classroom consisting of presentations (computer support), summaries, articles, links to web pages and additional teaching material.
The debate on the topic analyzed will be enhanced both with the teacher and with the rest of the classmates. Realization of individual or group bibliographic works. When the teacher so decides, the papers may be subject to examination.
Seminars, forums, debates, tutoring... Through tutoring, the teacher, at the request of the student and at the established time for this purpose, will answer questions or discuss the questions posed to him by the student, in order to guide him in learning the subject.
Evaluation.

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
32 Horas	43 Horas

SKILLS

Basic Skills

Students must have demonstrated knowledge and understanding in an area of study that is founded on general secondary education. Moreover, the area of study is typically at a level that includes certain aspects implying knowledge at the forefront of its field of study, albeit supported by advanced textbooks

Students must be able to apply their knowledge to their work or vocation in a professional manner and possess

skills that can typically be demonstrated by coming up with and sustaining arguments and solving problems within their field of study.

Students must have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgments that include reflections on pertinent social, scientific or ethical issues

Students must be able to convey information, ideas, problems and solutions to both an expert and non-expert audience

Students must have developed the learning skills needed to undertake further study with a high degree of independence

To be familiar with the applications of biotechnology in the healthcare, food, agrobiotechnological, environmental and chemical fields.

To understand the ethical implications of professional and personal activity.

Capacity for teamwork and group management.

To have acquired the ability for analytical, synthetic, reflective, critical, theoretical and practical thought.

To foster a concern for knowledge as a key tool in the personal and professional growth process of a student.

To value sciences as a cultural fact.

To recognize the mutual influence existing between science, society and technological development in order to strive for a sustainable future.

To develop an ability to search for, take in, analyze, sum up and relate information.

To develop oral and written communication skills.

General Skills

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Specific skills

Define the characteristics, properties and methods of studying viruses.

To know the molecular mechanisms of viral infections and the pathologies produced.

Know the procedures and strategies for the development of biotechnological tools based on certain viral genera.

Identify the basic mechanisms and processes of different human pathologies.

Ability to communicate the knowledge acquired orally and in writing.

Analyze and synthesize the main ideas and contents of all types of texts; discover the theses contained in them and the issues they raise, and critically judge their form and content.

LEARNING RESULTS

Define the fundamental characteristics of the different virus families. Mechanisms of replication, regulation and gene expression.

Identify mechanisms of viral growth and quantification.

Determine host responses to viral infection.

Identify the main groups of viruses in the context of their usefulness as “tools” in molecular biology and biotechnology

Learn about the applications of Virology in the health, food, agro-biotechnology, environmental and chemical fields.

Assess the importance of Virology in multiple areas of society.

Describe molecular pathology mechanisms associated with viral infections.

LEARNING APPRAISAL SYSTEM

Ordinary call:
1. Evaluation of the theoretical content of the subject: evaluation by means of a final exam at the end of the subject, which may be a test, development or short question type. It will represent a maximum of 80% of the student's final grade. It is necessary to pass the exam with a 5 to be able to average the rest of the grades.
2. Carrying out and presenting exercises, case studies, debates... (20%): These exercises can be individual, group or collaborative work. It is necessary for the student to pass the continuous evaluation block in order to pass the subject.
In order to average the different parts, it is essential to obtain a score equal to or greater than 5 in the exam and in the resolution of tasks/exercises.
If they do not pass the block of tasks, an oral or written assignment may be proposed to the student so that they can pass the subject in an extraordinary call. In the case of not passing either the exam or the block of exercises in the ordinary call, the student may be asked some extra questions in the exam that cover the% of tasks.
Extraordinary call: It will be an exam with characteristics similar to that of the ordinary call, which allow us to assess the acquisition of the competencies included in the teaching guide. To pass the subject, it will be necessary to pass the exam with a 5, as well as the proposed activities/exercises if necessary.
Alternative system:
Only in the case of students in the second call and later, and students with academic exemption, can they choose to take advantage of the previously specified Primary System or to take advantage of the alternative system in which the following percentages will be applied:
- Final theory exam (85%)
- Submission of a work/case/infographic... on subjects related to the subject (15%). It is essential to submit the assignment in a timely manner in order to pass the subject. If they do not pass the block of tasks, an oral or written assignment will be proposed to the student so that they can pass the subject in an extraordinary call. In the case of not passing either the exam or the block of exercises in the ordinary call, the student may be asked some extra questions in the exam that cover the% of tasks.
This decision must be communicated by email to the responsible teacher during the first two weeks of class. If you do not report, the evaluation will be taken over by the ordinary system.
Plagiarism, as well as the use of illegitimate means in evaluation tests, will be sanctioned in accordance with those established in the Evaluation Regulations and the University's Coexistence Regulations.

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following principles:
a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.
2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the Guide for the Responsible Use of Artificial Intelligence in Studies at UFV. Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.
3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the

student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Jane Flint... [et al.]. Principles of virology/5th ed. Washington D.C: American Society for Microbiology:Wiley, 2020. (Jane Flint... [et al.]. Principles of virology/5th ed. Washington D.C: American Society for Microbiology:Wiley, 2020. , ||CANN, Alan J. Principles of Molecular Virology/6th ed. London:Academic Press; ,2016.)

Moore, Luke. Infectious diseases, microbiology and virology: AA Q&A approach for specialist medical trainees/Cambridge: Cambridge University Press, 2020.