Use of Languages

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

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Use of Languages
Principal working language: English
English groups entirely in English: Yes
Catalan groups entirely in Catalan: No
Spanish: No

Other comments on languages
Classes are given in English

Teachers
Antonio Villaverde Corrales
Esther Vazquez Gomez

Prerequisites
Is essential to have a good level of spoken and written English and a general background in Biochemistry, Molecular Biology, Cell Biology, Microbiology and Immunology.

*All teaching activities and assessments will be carried out in English in any context (face-to-face, semipresential or online).

Objectives and Contextualisation
The teaching objectives of the course are the acquisition by students of basic knowledge about the biology, structure, genetics and evolution of viruses within the framework of its pathogenesis and pharmacological possibilities and research opportunities virology can offer in those fields. It will be also focused on emerging applications of the viruses in biotechnology and nanotechnology, and the need for constant updating of information through bibliographic databases.

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.
- Identify the molecular mechanisms of pathogenesis and relate them to the response to infection in order to design and develop strategies for diagnosing and combating diseases caused by microorganisms.
- 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. Identify and describe the microorganisms used in bioterrorism.
2. Identify the techniques used in the conservation and storage of microorganisms.
3. Identify the techniques used in the multiplication, detection and identification of viruses.
4. Identify viral elements that are useful for the design of antigens, immunogens and vaccines.
5. Identify viral elements that are useful for the design of diagnostic reagents.
6. Know and identify the biotechnological and nanomedical applications of viruses in microelectronics, as biosensors and for controlled drug delivery.
7. Know the molecular bases of viral invasiveness and virulence and recognise the value of attenuated viral variants in vaccine design.
8. Know the molecular processes of the viral cycle and identify the potential targets of antiviral drugs.
9. Know the most important groups of pathogenic microorganisms.
10. Obtain, select and manage information.
11. Understand the microbiological bases that are used to develop products of interest in healthcare.
12. Use bibliography or internet tools, specific to microbiology or other related disciplines, both in English and in the first language.
13. Use omics techniques for identifying target genes and proteins related to pathogenicity and virulence, and usable in the design of vaccines and antimicrobial compounds.
14. Work individually or in groups, in multidisciplinary teams and in an international context.

Content

1. An introduction to viruses and Virology


2. Historical overview of Virology


3. Viral multiplication


4. Viral structure


5. Viral genomes and genetics

vectors of viral origin.

6. Origin and evolution of viruses


7. Emerging viruses and viral diseases


8. Methods in Virology


9. Viral taxonomy


10. Prions and viroids


11. Bacteriophages


12. Viral pathogenesis


13. Responses to viral infection


14. Artificial viruses

Viral gene therapy; important features and biological risks. Artificial viruses as alternatives to viral gene therapy. Types of artificial viruses and used biomolecules. Modular strategies. Selection of functional domains. Examples and applications of artificial viruses.
“ Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents. ”

**Methodology**

The course will comprise classroom lectures and active learning activities with scientific problems and cases by which students will acquire skills necessary to perform literature research, propose experimental approaches and design problem solving strategies. Oral presentations of active learning activities will encourage teamwork, coordination of activities and rational presentation of work plans and results. Active learning activities will be focused on methodological aspects and biomedical, biotechnology, pharmaceutical and nanotechnological applications of virus as well as derived viral structures. Personal tutorial guidance sessions will be available by email appointment and will be held in the office C3/331. In those sessions, students will have the opportunity to receive individual guidance according to their needs.

“ The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities. ”

**Activities**

<table>
<thead>
<tr>
<th>Title</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type: Directed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active learning activities</td>
<td>15</td>
<td>0.6</td>
<td>10, 14, 12</td>
</tr>
<tr>
<td>Lectures</td>
<td>30</td>
<td>1.2</td>
<td>11, 9, 8, 6, 7, 4, 5, 1, 2, 3, 13</td>
</tr>
<tr>
<td><strong>Type: Supervised</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal tutorial guidance sessions</td>
<td>2</td>
<td>0.08</td>
<td>11, 9, 8, 6, 7, 4, 5, 1, 2, 3, 10, 14, 12, 13</td>
</tr>
<tr>
<td><strong>Type: Autonomous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group work: preparation of written reports</td>
<td>2</td>
<td>0.08</td>
<td>10, 14, 12</td>
</tr>
<tr>
<td>Literature search</td>
<td>28</td>
<td>1.12</td>
<td>10, 12</td>
</tr>
<tr>
<td>Personal study</td>
<td>44</td>
<td>1.76</td>
<td>11, 9, 8, 6, 7, 4, 5, 1, 2, 3, 13</td>
</tr>
<tr>
<td>Preparation of oral and written presentation of reports</td>
<td>1</td>
<td>0.04</td>
<td>10, 14, 12</td>
</tr>
<tr>
<td>Reading</td>
<td>23</td>
<td>0.92</td>
<td>10, 14</td>
</tr>
</tbody>
</table>

**Assessment**

The evaluation will be done through one midterm exam (20 %) and one final exam (50 %). The sum of the marks obtained in the evaluation of all written exams will represent 70 % of the final grade. Remedial exam will not be scheduled for the midterm exam (20 %). Remedial exam will be scheduled for the final exam (50 %). The mark obtained in the final exam (or remedial exam) must be higher than 4.0 to be used in the final mark calculation. In the case of obtaining a lower mark than 4.0 in the final exam (or remedial exam), provided the weighted average of all the activities is below 4.5, the maximum mark would be 4.5. 30 % of the grade will be obtained by oral and written presentations of assignments and classroom problem-solving activities, remedial exams will not be scheduled for any these activities.

Evaluation of classroom lecture competencies (70 % of final grade)

- During the course two written tests will be scheduled for this evaluation form. The first test will have a weight of 20 % and the second (final exam) a weight of 50 %. To be eligible for the retake process (final exam), the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as “Not Evaluable” if the weighting of all conducted evaluation activities is less than 67 % of the final score.

Evaluation of oral and written presentations (30 % of the final grade)

- Students will present the reports of the assigned active learning exercises in classroom sessions. Oral presentations will be evaluated on content, organization and communicative skills. Additional written reports will be evaluated on content and organization.
Delay in the delivery of activity assignments will represent a 100% reduction in the mark obtained in the evaluated activity.

EXAM TO GET A HIGHER GRADE: All those students who have passed both theory exams may retake the final exam to improve the grade of the subject. The student who wants to raise the mark (only theory) may re-examine the final exam (50%) as long as he or she has expressed in writing (email) his/her willingness to take the exam to the coordinator of the subject at least ten days before the final exam. By taking the exam in order to get a higher grade, the student implicitly renounces the grade he or she had obtained in the final exam. The grade that will be taken into account will be that of the last exam the student has taken. There is no option to improve the other grades.

“Student’s assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.”

### Assessment Activities

<table>
<thead>
<tr>
<th>Title</th>
<th>Weighting</th>
<th>Hours</th>
<th>ECTS</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of group assignments: written report</td>
<td>20 %</td>
<td>0</td>
<td>0</td>
<td>10, 14, 12</td>
</tr>
<tr>
<td>Final exam: multiple choice</td>
<td>50 %</td>
<td>3</td>
<td>0.12</td>
<td>11, 9, 8, 6, 7, 4, 5, 1, 2, 3, 13</td>
</tr>
<tr>
<td>First midterm exam: multiple choice</td>
<td>20 %</td>
<td>2</td>
<td>0.08</td>
<td>9, 7, 1, 2, 3</td>
</tr>
<tr>
<td>Oral and/or written presentation of reports</td>
<td>10 %</td>
<td>0</td>
<td>0</td>
<td>10, 14, 12</td>
</tr>
</tbody>
</table>

### Bibliography

If we think using language, then new thoughts that do not already exist in the language may never be formulated. If thinking is possible without language, then what is it and why do animals not think like humans? Neurolinguistics. Psycholinguistics. Of course, we think using language only....Without language, whatever comes in mind that is called as "Abstract thinking". Cite. 3 Recommendations. We cooperate with each other to use language for communication; language is often used to communicate about and even construct and maintain our social world. La... Å Humans have the capacity to use complex language, far more than any other species on Earth. We cooperate with each other to use language for communication; language is often used to communicate about and even construct and maintain our social world. Language use and human sociality are inseparable parts of Homo sapiens as a biological species. î " Share. Å —.